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“It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted: and it will die away, if they shall entirely cease.”—

SIR WM. JONES.

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1861.

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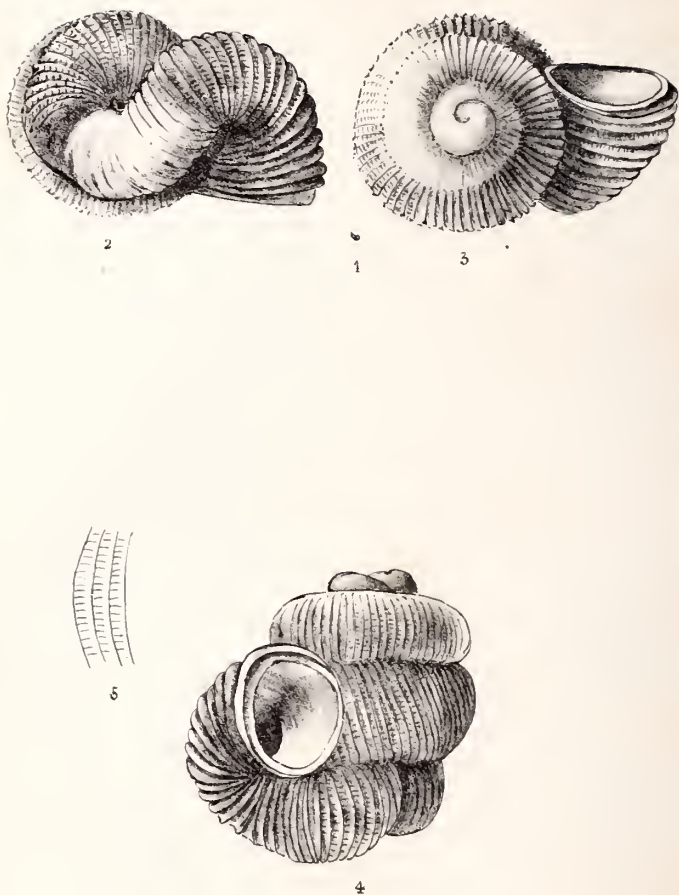
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OPISTHOSTOMA NILGIRICA

JOURNAL

OF THE

ASIATIC SOCIETY.

No. II. 1860.

Contributions to Indian Malacology, No. I.—By Messrs. W. T. and H. F. BLANFORD, of the Geological Survey of India.

In a paper published in the Annals and Magazine of Natural History for 1857,* Mr. W. H. Benson gave an able resumé of the distribution of the *Cyclostomaceæ* of South-western Asia and of some of the neighbouring islands. As regarded their distribution in India, both Cis and Trans-gangetic, it was proved that the evidence then available shewed a considerable generic distinction between the forms of the Indian peninsula with Ceylon on the one hand, and those occupying the Himalayas, the Khasi hills, Burmah, and the Malay countries on the other. It was also attempted to be shewn that, if two streams of distinct genera were supposed to extend from the island of Borneo, one might be imagined to pass up through the eastern, the other through the western peninsula, the valley of the Ganges and the plains of Northern India being the limit of each line.

At that time it was believed that no single species of land shell occurred at the same time upon the Himalayas, and in India south of the Ganges. A few widely disseminated species, such as *Helix vitrinoides*, are certainly to be found at the base of the mountains, as well as universally over the plains, but even at the foot of the Himalayas a great change takes place in the fauna generally, and when once fairly within the mountains, scarcely a species of the Indian plains recurs. But there are a few exceptions. In the Annals for April, 1859, Mr. Benson mentioned the discovery by one of ourselves of

* Ann. and Mag. of Nat. Hist. Vol. XIX. p. 201.

Helix castra, Benson, on the hills of Balasore in Northern Orissa, and more recently a single specimen of a shell perfectly undistinguishable from *Helix Huttoni*, Pfeiffer, has occurred to us on the northern flank of the Nilgiri mountains in Southern India.* Both of these species have a wide distribution; *H. castra* being known to range from Sikkim to the Tenasserim provinces, and *H. Huttoni* throughout the greater portion of the Himalayas. Indeed it is more than probable, from an examination of recently collected specimens of *H. tapina*, Benson, that *H. Huttoni* is only a variety of that species, an identity which, if substantiated, will extend its range to the Khasi Hills and Burmah, where the variable but scarcely distinguishable *H. rotatoria*, V. d. Busch, replaces it, unless the latter also prove to be only a variety.

It is exceedingly probable that, as each region becomes more thoroughly searched, many other species will be found to have a far more extensive range than is at present supposed. The peninsula of India is, as a rule, extremely poor in land shells, and the conchologist may travel for miles over its plains without meeting with a single mollusk. The plains of Bengal, from a space as large as the British Isles, have scarcely furnished twenty species. On the contrary the Himalayas, especially their eastern portion, and the Burmese peninsula, appear to be extremely rich both in species and individuals, a circumstance doubtless intimately connected with the greater and more constant humidity of the climate. With a few exceptions, Cis-gangetic India has been fairly explored by conchologists, although it has not been thoroughly searched. Of Trans-gangetic India, nine-tenths are totally unexamined. At least half of the Himalayas have never been visited, and all that has been carefully explored consists of a considerable tract in the western Himalayas around Simla and Masúri, and the outer hills of Sikkim, from which we ourselves, but the other day, procured more than twenty undescribed forms. The Khasi Hills, a small tract of country, have been fairly examined, but the vast peninsula thence to Singapore has only been searched in the immediate neighbourhood of Molmain, whilst a few shells have been collected during hurried visits, or (the larger species

* Mr. Benson also informs us that he has received *H. fastigiata*, Hutt. from the Nilgiris.

especially) procured by accident from Pegu, Ava, the Tenasserim provinces, Penang, Malacca, Singapore and perhaps one or two other places. The greater portion of the mountains north of the Punjab, the vast tract of Nepal, the interior valleys of Sikkim, Bhotan, Assam with the mountains both north and south of it, Arracan, and, with the few exceptions mentioned, the Malay peninsula, are totally unsearched. Despite these circumstances, the list of shells described from the Himalayas and Burmah alone probably exceeds that from all the Indian peninsula.

But even India proper may yet yield important novelties. Perhaps no part has been more carefully or more repeatedly examined than the Nilgiri hills of Southern India. They are perhaps the last place whence generic forms new to the country might be expected, yet we have been so fortunate as to meet with such, among the smaller shells as might naturally be expected, but by no means amongst those least interesting.

Amongst the genera enumerated as characterizing India north of the Ganges and east of the Bay of Bengal, none perhaps is more generally distributed or more abundant than the singular little genus *Alycæus*, Gray. Another form which, however, perhaps chiefly on account of its minute size, has not as yet been shewn to have an equal range in these countries with *Alycæus*, but which also occurs in Mr. Benson's list of genera confined to the northern and eastern regions of India, is *Diplommatina*, Benson. The discovery of species of both of these genera, in a district so well examined previously as the Nilgiri hills have been, must make us pause before we conclude that we are in possession of data sufficient to enable us to come to definite conclusions upon the distribution of Indian land shells.

The circumstance of their discovery becomes less surprising when we consider that there are several species of shells on the Nilgiris closely representative of Himalayan and Burmese forms. Thus *Helix Cycloplax*, Benson, of Sikkim and *H. Oxytes*, B., of the Khasi hills are replaced by *H. Thyreus*, B.; *Achatina tenuispira*, B. of Sikkim, Khasi, Burmah, &c. by *A. Shiplayi*, Pfr.; *Bulimus vibex*, Hutt, and *B. cœlebs*, B. of the Western Himalaya by *B. Nilagiricus*, Pfr. &c.

To return to the genera of *Cyclostomaceæ*; there are to be found on the eastern side of the Bay of Bengal and in the Himalayas the

following genera which are absent on the western side of the Bay: *Megalomastoma*, *Pupina*, *Registoma*,* *Raphaulus*, *Streptaulus*, and *Hybocystis* (all of which are closely allied genera and of one type) *Hydrocena* and *Pomatias*, the last being probably only an outlier. In Ceylon there is one peculiar genus, *Aulopoma*, but it is evident that Ceylon is a generic area by itself. Lastly there are common to both sides of the Bay of Bengal or of the Ganges valley *Cyclophorus*, *Cyclotus*, *Pterocyclos*, *Leptopoma*, *Cataulus*,† *Alycæus* and *Diplommatina*. In the Indian peninsula, properly speaking, not one generic form exists, which is wanting in Trans-gangetic countries, with the exception perhaps of the little shell which we now describe under the name of *Opisthostoma*: but even assuming this genus to be decidedly operculate, it would be premature to assert that so minute a shell has no specific representative in the Himalayan or Burmese areas ‡ *Otopoma* only occurs in Katiwar, where the climate is different from that of India proper, and where all organic nature shews an intermixture of Indian forms with those of South-western Asia and of Africa.

We can therefore only conclude that scarcely sufficient is yet known to justify a decided opinion as to the distribution of the land shells of India and the adjoining countries. So far as the most recent discoveries enable us to form a judgment, we agree with Mr. Benson in considering that a generic distinction does exist between the two areas of Cis and Trans-gangetic India, but we doubt whether it is satisfactorily shewn that Borneo is the generic centre around which all the forms of South-western Asia and the Indian Archipelago are

* In the Nicobar Islands.

† One species in the Nicobar Islands.

‡ Since these remarks were written, Mr. Benson has described, in the Ann. and Mag. for Feb. 1860, two new genera of operculate land shells from Molmain, and has named them *Rhiostoma* and *Clostophis*. The former is allied to *Pterocyclos*, the latter is a minute form, probably allied to *Diplommatina* and *Opisthostoma*. Like the latter it is separated from the former on account of peculiarities in the last whorl, which, in *Clostophis*, is free and descending. It is possible that other species allied to these new forms may hereafter be discovered, and the two types be found to represent and replace each other in the Indian and Burmese areas.

grouped; or that the distinctions between the Indian areas are satisfactorily explained by considering them as "streams" of generic affinity radiating from that island. So far as our present knowledge extends we are inclined to look upon the distinction as consisting mainly in the more favorable conditions for land shells generally in the moist countries of the Himalayas and of the Burmese and Malay peninsula, in the absence of shells of the *Pupina* and *Megalomastoma* type in the Indian peninsula, (a circumstance doubtless connected with the greater dryness of the country) and in the existence of a generic centre in the island of Ceylon, characterized especially among the *Cyclostomaceæ* by forms of *Aulopoma* and *Catulus*.

The shells described in the following pages were obtained in collections made by Mr. H. F. Blanford in 1857, and by Mr. W. T. Blanford during a short visit in 1859. A few other forms procured at the same time are also believed to be undescribed, but as they are of less interest, they must await further leisure.

OPISTHOSTOMA, gen. nov.

Testa operculata? Anfractibus apicalibus obliquiter deflectis, anfractu ultimo constricto, deinde inflato, denique sinistrorsim ascendente, anfractibus superioribus contiguo; aperturâ reversâ, rotundatâ, continuâ; peristomate duplicato.

1.—O. NILGIRICA, n. s.

Testa minima, truncate pupiformis, anguste umbilicata; spirâ irregulari, apice obtusâ, obliquâ, suturâ profundâ; costulata, interspatiis minutissime decussatis, albida, translucens. Anfractus rotundati, 5, quorum duo primi obliquiter contorti; ultimus constrictus, deinde inflatus, refractus, ascendens, denique sinistrorsus, anfractum penultimum contingens. Apertura subobliqua, superne versata, orbicularis. Peristoma continuum, incrassatum, duplicatum.

Diam. maj., 1.3 m. m.

Alt., 1.1 m. m.

Habitat apud Pykara ad summos montes "Nilgiri" inter folia caduca humida sylvarum.

Of this remarkable little shell the first and only known specimens were found by one of us rather more than two years since in the dead leaves of one of the little thickets termed "sholas" near Pykara on

the Nilgiris. As all the specimens found were dead shells and it seemed most desirable to obtain living specimens in order to determine satisfactorily the nature of the species from an inspection of the animal, we have hitherto abstained from publishing a description which must of necessity be imperfect, in the hope, either that one of ourselves might revisit the hills and procure a supply of living specimens, or that some of our friends conchologically inclined, might aid us in the matter. We have, we regret to say, been disappointed in these expectations, and we therefore publish the description and figure of the shell, hoping that publicity may lead others to the search, and we leave the question of the nature of the animal and the existence of an operculum to be settled at some future period.

To the kind aid of Capt. Mitchell of Madras we are indebted for the accompanying figures, drawn with the aid of the camera lucida, and magnified about 30 diameters. The specimen from which the drawings are taken is in excellent preservation and shews very clearly not only the costulation, which bears a great resemblance to that of *Diplommatina* and *Alycæus*, but also a regular scalariform decussation of the interstitial spaces which is represented on an enlarged scale in figure 5. This costulation and more especially the *Alycæus*-like strangulation and inflation of the last whorl point to the probability of the present being an operculate genus, and the round whorls and continuous and duplicate peristome lead to the same conclusion. No trace of a tube is perceptible on any part of the shell.

From these characters we should infer that *Opisthostoma* holds an intermediate place between *Alycæus* and *Diplommatina*, resembling the former in the strangulation and distortion of the last whorl, the latter in the pupiform shape and in the rise of the last whorl upon the penultimate, and both in the duplication of the peristome, and in the regular costulate ornamentation: but the peculiar distortion of the apical whorls and the hyperstomoid flexure of the last whorl are characters not hitherto found in any operculate genus, and having their analogues in *Streptaxis* and *Boysia* among inoperculate shells. Seeing, however, the great variation of spiral form that obtains in the different Cyclostomaceous genera, no great weight can, we think, be attached to spiral peculiarities when opposed to the evidence of the characters above enumerated which connect *Opisthos-*

toma with operculate forms, and until further evidence shall shew such a view to be untenable, we may regard the present as one more of the peculiar Cyclophoroid genera which seem specially to characterize the Indian and Bornean provinces.

2.—*ALYCEUS EXPATRIATUS*, n. s.

Testa mediocriter umbilicata, depressa, ad anfractos internos obsolete, ad ultimum fortius, ad spatium inflatum valde, crebre costulata, corneo-albida, apice diaphane rubella; spira vix elevata, apice obtusa; sutura impressa; anfr. $3\frac{1}{2}$ convexi, ultimus ad latus mediocriter inflatus, deinde constrictus; constrictione longa, medio tumida, glabra; tubulum suturale pone constrictionem oriens, mediocriter longum, plerumque $\frac{1}{5}$ peripheriæ subæquans, sed nonnullis exemplis brevius; apertura circularis, obliqua, juxta anfr. penultimum retro curvatum; perist. duplex; internum breviter porrectum, continuum, externum expansum, interruptum, columellari margine strictum. Operculum corneum, distincte multispirum, anfr. 7-8 planulatis, externe perconca- vum, nucleo centrali interno prominente papillari.

Diam. maj.	$4\frac{1}{2}$ m. m.
Ditto min.	$3\frac{3}{4}$ ditto.
Alt.	$2\frac{1}{2}$ ditto.
Apert. diam.	$1\frac{3}{4}$ ditto.

Hab. Haud raro ad Neddooowuttom ghat, ad latus septentrionale montium "Nilgiri" Indiæ australis et circa 3000—4000 ped. alt.

This species appears to be more depressed in the spire than any other of the genus, except perhaps the Bornean *A. spiracellum*, A. Ad. and Reeve. Its nearest Indian ally is *A. strangulatus*, Hutton, and in size it is intermediate between that species and *A. stylifer*, Bens. It belongs to the section *Charax* of Benson, having a wide strangulation behind the peristome, crossed by a swollen ridge, which, however, in *A. expatriatus* never presents the sharpness so remarkable in *A. stylifer* and *hebes*, but is rather a broad tumid space separating two narrow constrictions. The sutural tube is variable in length, sometimes being nearly as short as in *A. strangulatus*, in other specimens as long as in *A. stylifer*; the latter being the usual case, the former the exception, but both occur in perfectly fresh and full grown specimens.

From *A. strangulatus*, the species is distinguished by its greater size, more depressed form, more oblique aperture, by the recurvation of the peristome at its junction with the penultimate whorl, the longer sutural tube, the greater distance of the ridge crossing the constriction from the mouth, and the closer sculpture. From *prosectus* and *stylifer*, the characters of the peristome, which is simple in *stylifer* and expanded at the columellar margin in *prosectus*, besides the smaller size of *A. expatriatus*; from *hebes* and *gemmula* the slightly prominent ridge not recurved and the depressed form afford abundant grounds for distinction. *A. spiracellum* of Borneo is probably closely allied, but we are only acquainted with that shell by its description. Judging therefrom *A. expatriatus* should be distinguished by its smaller size, more narrow umbilicus, greater bluntness of the ridge in the constriction, and in general by the greater length of the sutural tube, a character which, however, is evidently, from its variability in this species, of less value than has hitherto been supposed.

The species occurred near the base of Neddoowuttom ghat, and a little above the village of Goodaloor. The animal is small and colourless; the body very short; the sole undivided; tail short and rather pointed; tentacles short, yellowish; muzzle blunt, not elongated.

3.—DIPLOMMATINA NILGIRICA, n. s.

Testa dextrorsa, imperforata, subovata, *glabra*, tenuis, nitida, cornea; spira conoidea, apice obtusa; anfr. 6 convexi, superne leniter crescentes, ultimus parum angustior, antice ascendens, carinâ costiformi circa umbilicum munitus; apertura subverticalis, circularis; perist. haud dentatum, duplex; externum breviter expansum, interruptum; internum mediocriter porrectum, continuum. Operc. corneum, subcirculare, ad suturam angulatum, planum, haud spiratum.

Long.	3 m. m.
Diam. max.,	1 $\frac{1}{4}$ ditto.
Apert. diam.,	$\frac{3}{4}$ ditto.
Anfr. ultimi long.,	1 ditto.

Habitat in sylvis prope Pykara versus apices montium "Nilgiri" (ad alt. circa 7000 ped.).

This species is distinguished from all others of the genus yet described by the ridge around the umbilicus, which is an exact coun-

terpart of that in the Sikkim shell, *Megalomastoma funiculatum*, B. The perfect smoothness of Dip. Nilgirica, and the continuity of the internal peristome, give it a sub-generic character, yet seem insufficient alone to authorize its separation from *Diplommatina*.

The animal could not be well observed for the want of a sufficiently powerful magnifier at hand. It was small, short, and colourless, with two small black tentacles.

4.—CYCLOTUS MALABARICUS, n. s.

Testa subaperte umbilicata, depresso-conica, albida, glabra, nitidula, epidermide deciduâ corneâ, ad anfr. ultimum transverse fusco-strigatâ, induta; spira conica, apice acuta; sutura profunda; anfr. 4 rotundati, celeriter crescentes, ultimus cylindraceus; apertura parum obliqua, circularis, prope umbilicum parum sinuata, superne vix angulata; perist. duplex, externum brevissime expansum, internum porrectum, acutum, continuum; umbilicus perspectivus. Operculum haud immersum, duplex, internum corneum multispirum, externum testaceum, anfractuum marginibus lamella spirali, albidâ, scabrâ ad anfr. externos perelevatâ et versus centrum incurvatâ, quasi convexâ, munitis.

Diam. maj.,	3 $\frac{1}{4}$ m. m.
Ditto min.,	2 $\frac{3}{4}$ ditto.
Alt.,	2 $\frac{1}{2}$ ditto.
Apert. diam.,	1 $\frac{1}{8}$ ditto.

Hab. sub rupibus et saxis in terrâ humidâ ad margines sylvarum prope Pykara montium "Nilgiri," ad alt. 7000 ped.

Nearly allied to *Cyclotus filocinctus*, Benson, by the peculiarity of its operculum, this shell is distinguished by its smaller size, more depressed form, and less expanded peristome, by the absence of the marked sculpture of *C. filocinctus*, and by the epidermis being lighter in colour and marked by brown transverse streaks on the last whorl. That of *C. filocinctus* is hispid. The last named shell was first described by Mr. Benson as a *Cyclostoma*, to which genus it was assigned till lately. The construction of the operculum is very peculiar. The testaceous spiral lamina being very much more raised towards the exterior than towards the centre, and being curved inwards, the interior whorls of the operculum are almost concealed and the appearance, unless very closely examined, is that of the oper-

culum of a *Turbo* hollowed out at the centre. The lamella in *C. Malabaricus* is rather more elevated than even in *C. filocinctus*.

The animal of *C. Malabaricus* we have not had an opportunity of observing, that of *C. filocinctus* belongs to the Cyclophoroid group,* the sole of the foot being undivided, the tentacles tapering, and the muzzle short and blunt. The foot is short, broad and rounded at the tail, the tentacles are black, rather short, and contractile, with the eyes at their base, the body is colourless, with the exception of black patches above the head and at the base of the tentacles.

C. filocinctus abounds on the N. side of the Nilgheris, but we have not met with it on the top of the hills. It is found chiefly in decaying leaves and moist earth beside rocks and stones. *C. Malabaricum* with *Dip. Nilgirica*, *Ennea Pirriei*, Pfr. and some minute Helices, occurred at the edges of the small patches of forest, known as "sholas," which abound in every small hollow in the hills, and are remarkable from the abruptness of their boundaries, a few feet leading from dense jungle to the open grassy hill side. Under the shrubs at the edges of sholas is generally a great resort of land shells.

5.—STREPTAXIS WATSONI, n. s.

Testa subumbilicata, compresse ovata, corneo-albida, nitida, superne transverse arcuato-striata, infra obsolete striatula, interdum ad ultimum anfractum lineis albidis versus suturam cincta; spira fere plana; sutura impressa; anfr. 6 convexiusculi, 2 ultimi e axi deviantes, ultimus rotundatus; apertura obliqua, elongato-lunaris, juxta anfr. penultimum acute retro sinuata, margine basali paulo arcuata; perist. reflexum, subincrassatum, albidum, tridentatum, singulis dentibus depressionibus pone peristoma externe correspondentibus; dentes 2 lamelliformes margine dextro, 1 columellari quasi basali; marginibus peristomatis callo, duas lamellas approximatas juxta suturam gerente, junctis.

Diam. maj.,	6½ m. m.
Ditto min.	4½ ditto.
Alt.	3 ditto.

* In common probably with every other operculated Indian land shell except *Otopoma clausum*, Sow, and perhaps the two species of *Pomatias* described by Mr. Benson from the Himalaya and Khasi Hills.

Hab. in sylvis, præsertim prope arborum radices, ad apices montium "Nilgiri." Var. est, peristomate quinque dentato, dente uno minimo versus sinum aperturæ, tribus normalibus, uno minuto juxta umbilicum; dente ad marginem columellarem alteris latiore, quæ prope "Avalanche," ad pedem montium "Koondah" habitat.

This species appears to be more abundant than the previously described form, *Str. Perrotteti*,* Petit, from which it differs in its much smaller size, and despite this, in the greater development of its teeth, and also in the presence of two lamellæ instead of one on the callus joining the margins of the peristome. It appears to inhabit only the more southerly portions of the hills, but our researches have not been sufficiently extensive to render this a certainty. *Str. Perrotteti* occurred at Neddiwuttom, and on the hills N. of Ootacamund; *Str. Watsoni* we found S. of Ootacamund, and the variety at the base of the Koondahs. Both were obtained at an elevation of 6000 to 7000 feet. Although the variety differs slightly in the teeth, in the presence, viz. of two teeth which are absent in the normal form, these additional projections are so very minute that they might easily become obsolete, and probably additional specimens might shew a complete gradation, while the shells are so exactly similar in every other detail of form, that we have no hesitation in pronouncing them identical.

Explanation of figures.

- 1.—Opisthostoma Nilgircum. Natural size.
- 2, 3, 4.—The same magnified 90 diameters (900 times).
- 5.—Scalariform costulation further enlarged.

* Or is this Petit's original species and that described by Pfeiffer distinct? In that case the names may be exchanged.

*Memorandum on the great flood of the river Indus which reached Attok on the 10th August, 1858.—By Captain T. G. MONTGOMERIE, Bengal Engineers, F. R. G. S. 1st Asst. G. T. Survey, of India, &c.**

“At 5 A. M. on the 10th August, 1858, the Indus at Attok was very low. At 7 A. M. it had risen 10 feet. By 0.30 P. M. it had risen 50 feet, and it continued to rise till it stood 90 feet higher than it did in the morning. The Cabul river continued to flow upwards for ten hours.”—*Extract from the proceedings of the Asiatic Society for September 1858, Journal Vol. XXVII. p. 366.*

The flood destroyed a large amount of property in British territory both above and below Attok; and the back water (on the Cabul river) destroyed the greater part of the private property in the cantonment of Naoshera.

After the subsidence of the water, numerous reports were current near Attok, viz.: that the river was still blocked up and that another similar flood might soon be expected. These reports were generally given out on the authority of the inhabitants far up the river, who had sent down word to say that the water was still dammed up.

Such a sudden flood or cataclysm on such a gigantic scale, at all times an important and interesting subject of enquiry, was rendered still more so to me by the above mentioned circumstances.

Being at the time of the flood in the territories of the Máharajah Rumbhir Singh. I was in a favorable position for making enquiries in the Upper Valley of the Indus as far as the Máharajah's territories and influence extended, and I consequently made all the enquiries that I could.

On applying to the Wazeer Punnoo, the governor of Kashmir, he told me that had any damage been done in the Máharajah's territories by a flood on the Indus, he would certainly have heard of it, but up to that time he had received no report on the subject. However I begged him to write to all the Máharajah's officials (on the

* See papers by Capt. Henderson and Major Becher, Journal, Vol. XXVIII. pp. 199 and 219.

Indus and on its tributaries)* to enquire whether any extraordinary flood had been noticed. The answers were all in the negative except that from Boonjee, (the Máharajah's most northerly fort and cantonment on the Gilgit frontier) the report was as follows, viz. :—

“That a great flood (burá sailab) was noticed by the sepoy at Boonjee on the 27th day of “Sáwan Mahina,” “derh pahar din gaiya” when it first arrived. Shortly afterwards the sepoy saw a mass of timbers floating down the stream, which they recognised as belonging to the gateway of the Númbúl fort.”

The Númbúl fort is said to have been on the Gilgit river below the point where the Naggar river joins the Gilgit river.

I understand “the 27th day of Sáwan Mahina, derh pahar din gaiya” to mean the 11th day of August about 9 or 10 in the morning. Although this is the day *after* the flood was noticed at Attok, it is in my opinion sufficiently near the date to make it highly probable that it was the same flood that was noticed at Attok.

At a frontier outpost of the Máharajah's (where no one goes that has sense enough to make interest to keep away), a mistake of two or three days in the date would be no wonderful thing considering the general indifference of natives on the subject of dates and the numerous doubts as to when their months begin.

I am therefore of opinion that the flood (sailab) noticed at Boonjee was the same that passed Attok on the 10th of August, and for reasons given hereafter I am of opinion that the sepoy's date at Boonjee should have been the 25th of Sáwan or the 9th of August about 9 or 10 A. M.

The Trigonometrical height of Skardo the capital of Little Thibet situated on the river Indus has been ascertained to be about 7700† feet above the sea and that of the G. T. Station eighteen miles above Attok has been found to be about 1050‡ feet above the sea, thus shewing a difference of height between the two places of about 6650 feet. The distance between Skardo and the above G. T. Station by the course of the river Indus is approximately about three hundred and ten miles, and consequently there is an average fall in

* Specially mentioning the Shayok river.

† G. T. S. point near Skardo fort 7701 very little above river.

‡ G. T. S. Station on river eighteen miles above Attok and 1049 feet above sea.

130 *Memorandum on the great flood of the river Indus.* [No. 2,
the bed of the Indus between those places of about $21\frac{4}{10}$ feet
per mile.

Similarly the height of Baramoola where the Jhelum river leaves the Kashmir valley is about 4930* feet, that of the river† two miles below Jhelum is about 750 feet above the sea, shewing a difference in height between the two places of about 4180 feet. The distance by the course of the river Jhelum between those two places is about one hundred and ninety-four miles giving an average fall in the bed of the Jhelum of a little over $21\frac{5}{10}$ feet per mile.

Consequently we may assume that the Indus and Jhelum rivers flow at (very nearly) the same average rate between the respective places mentioned.

With the assistance of Lieut. Melville‡ I measured the rate of the Jhelum river at Naoshera, one march below Baramoola, in as slow a part of the stream, as there is between Baramoola and Jhelum, and I found the rate to be nearly 690 feet per minute, or about seven miles per hour. And Lieut. Melville quite agreed with me that we had taken a place where the rate§ was far below the average. The river Jhelum between the points mentioned has in general such rugged and precipitous banks that it was with difficulty that even the above measurement was made.

The distance from Boonjee to Attok may be taken approximately as about two hundred and twenty miles, and if the flood in question was the one noticed at Boonjee it traversed the distance between those two places between 10 o'clock in the morning of some day before the 10th of August and say 6 A. M. of the 10th August, that is the flood must have taken either twenty-one hours or forty-five or sixty-nine &c. to traverse two hundred and twenty miles, that is, it must have passed Boonjee on 9th, 8th or 7th of August. Had the flood passed Boonjee on the 8th August, it would have taken forty-five hours and would have travelled at the rate of hardly five miles an hour, but it has been shewn above that the average rate of the

* Baramoola Barometrical height 4938 feet above sea.

† G. T. S. point two miles below Jhelum 758 feet above sea.

‡ Topographical Asst. Great Trigonometrical Survey.

§ Seven miles an hour may be assumed to have been the minimum rate of the Jhelum river.

Indus must be above seven miles an hour in ordinary times, and of course much greater during a flood, so it may, I think, be fairly concluded that the flood would take only about twenty-one hours in traversing the two hundred and twenty miles, and that it passed Boonjee on the 9th August, 1858, about 10 A. M. If so it travelled at the rate of ten and half miles per hour, by no means an improbable rate* as the Ganges when it issues from the hills opposite Hurdwar is stated by the Canal officers to flow in ordinary times at nine miles an hour, and its pace looks slow compared with that of the Jhelum below Baramoola.

As soon as I got the report from Boonjee I sent for further information but could only make out that the flood was understood to come from Naggar, an independent district which the Máharajah's people called a part of Yághistan! quite inaccessible to ordinary messengers. Nothing would induce a man to go there; and the Wazeer said that when a present was offered, the man took the money, but only went a short distance and returned after a time with a made-up-story.

Though repeated enquiries were made, nothing further was elicited.

Indeed beyond the fact that the flood had come from the Gilgit river, as reported by natives and as shewn by its carrying away the well known gateway of the Númbúl Fort, nothing positive was known as to the cause of the flood or of the exact site of the place dammed up, though the Boonjee sepoy's believed that it came from the Naggar valley which is drained by an Eastern tributary of the Gilgit river.

Whether the flood in question came from Naggar or not, I feel quite certain that it did not come from above Skardo. At the time of the flood two of my assistants were working round Skardo, and another was working on the Shayok river within a month afterwards. I asked them to make particular enquiries, but they heard nothing of a large flood from any of the inhabitants of those parts.

* A table taken from the Philosophical transactions gives 480 feet in one minute or nearly five and a half miles an hour as the velocity of absolute torrents with an inclination of only 3 feet 1.27 inches per mile. The table gives no greater inclinations.

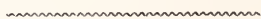
Had the flood been generated on any of the tributaries of the Shayok I must have heard of it, as the damage done by the water on first escaping from the barrier or dam would have been very great in the Shayok valley itself.

No report was prevalent at Boonjee or elsewhere in the Máharájah's territories as to any river being still dammed up or as to the prospect of another flood.

Should the river Indus or any of its tributaries be hereafter dammed up in any part of the Máharájah's territories, there would not be much difficulty in getting information from the Máharájah's officials, if proper measures were taken for collecting the same.

If timely warning were given, I think that the water might be eased off, if the place was accessible and labour was available for the necessary blasting, mining and other operations.

If, however, an obstruction should arise on the Gilgit river or any of its tributaries, there is, in the present political state of those valleys, no chance of getting timely warning or any accurate information, and if such was forthcoming, nothing could be done as to easing off the water unless the Engineer was accompanied by troops.



Memorandum in answer to the five following questions by Captain T. G. MONTGOMERIE, Bengal Engineers, F. R. G. S., 1st Asst. G. T. Survey, &c.*

1st. Whether there is any truth in a prevalent rumour that the Indus or one of its tributaries is still obstructed, and how it arose?

2nd. When the late cataclysm of 1858 (August) occurred and how it arose?

3rd. Whether such accidents are likely to be limited to one locality or may occur in several points of the Upper Indus and its feeders among the mountains?

4th. Where is the probable locality of the cataclysm of 1841, and how was it occasioned?

* Questions proposed by Major Becher, Bengal Engrs.

5th. What means are the most available for ascertaining the occurrence of such a calamity in future ?

1st. There is no report prevalent in the Máharájah's territories as to any portion of the river Indus or its tributaries being dammed up.

2nd. In my opinion the late cataclysm of August 1858 was generated in the Naggar valley on a tributary of the Gilgit river, see accompanying Memorandum on the flood of 1858.

3rd. I do not think such accidents are likely to be confined to one locality only. On the contrary, I think they may occur in a great many places both on the main Indus and on its tributaries. The main river would not, however, be likely to submit to any obstruction so long as the tributaries would.

4th. I have made enquiries about the flood or cataclysm of 1841, as far as I have heard at present I am inclined to think that it did not arise in the Shayok river. The Khapalu Rájah Mahomed Ali Khan says in a letter of July 1859, that the last great flood on the Shayok river took place about twenty-four years ago, that is in 1835, but that he was a small boy at the time and did not remember it well. His district suffered very much during the flood and had it occurred in 1841 he would have remembered all the circumstances. I have again addressed the Rájah on the subject and have asked for more precise dates.

Again I think, on examining the existing maps of the Upper Indus, that it is highly improbable that the damming up of the head of the Shayok river* would make the Indus look smaller at Attok than it otherwise would be. Had the whole of the Shayok river been stopped, the Indus at Attok might have looked smaller than usual but not so for less than a tenth part. And this applies both to the flood of 1841 and 1858, if on the latter occasion the river really was much lower than it would have been had there been no flood—I am of opinion that if the water that falls into the Shayok above Sassar† never fell into it again, no one would ever notice the loss at Attok.

* At a point not more than forty miles below its sources.

† The point where the cataclysm of 1841 was said by some to have been generated.

3. According to accounts of the cataclysm of 1841 the river Indus was observed to be unusually low in December 1840 and January 1841 at Attok and lower still in February and March. If that was the case it would point to the damming up of something that contributed more water than the head of the Shayok possibly could. Indeed when the channel was open but little water could descend during December and January from such a cold tract as that of the Shayok above Sassar, when snow only falls and when the melting of the glaciers must have almost ceased. Moreover the area drained by the Shayok at Sassar is comparatively speaking insignificant.

It is a question whether it was not simply a matter of gossip as to the Indus having been unusually low* both in 1841 and in 1858. In the *latter* case the fact is very doubtful. People on the river would naturally say "we noticed that it was very low, &c."

It would require a very careful registration of the height of the river for several years in order to come to any trustworthy conclusion as to whether the Indus was at any period lower or higher than the average.

If some sort of daily register was kept at Attok light might possibly be thrown upon any future cataclysm that may occur. Observations should be made as to the height† giving the daily maximum and minimum heights and noting the time, velocity, temperature, colour, &c. of the water with general remarks on the weather.

As to getting timely warning of the damming up of the Indus or any of its tributaries, the Lieut.-Governor of the Punjab will I have no doubt be able to get the necessary information from the Máharajah's officials if it arises in the Máharajah's territories. Should it however arise in the Gilgit river or its tributaries, there is no hope of getting any, as I have explained in my memorandum on the flood. As far as the Máharajah's territories are concerned I

* The Indus is, I believe, generally very low in December and January.

† The height to be referred to some permanent bench mark not liable to destruction.

All the rivers in the Punjab have a tide or daily maximum and minimum height in the mountains caused by the difference between the amount of snow melted during the night and during the day.

recommend that periodical reports should be obtained from the Máharajah's officials at Boonjee, Skardo and Leh, say once a month whilst the passes are open, in order to shew that their attention is directed to the subject—special reports to be made directly any reliable information is obtained as to any obstruction in the Indus or its branches. In the winter months men without loads can in fine weather often cross from the valley of the Indus to that of Kashmir, it only requires a sufficient inducement.

The officer at Boonjee should be requested to report on the river in the neighbourhood of the fort and to get all the information that he can from the Gilgit countries, viz. Naggar, Hunza, Yassin, &c.

The officer at Skardo to report on the river in his neighbourhood* more especially on the Shayok river and its tributaries getting information from the Khapalu Rajah and the Kardar of Nubra.

The Thanadar of Ladak to report on all the rivers in his district.

The Máharajah is at present preparing for an expedition against Gilgit and may possibly succeed next year in establishing his posts in that valley, should he do so Hunza and Naggar will most probably come under his rule and Yassin may come under his influence. In that case information might be forthcoming as to the state of all the countries drained by the Gilgit river.

Under all circumstances it is very difficult to get information on such a subject, the natives take little interest in it, and barriers formed by landslips or glaciers may arise in some of the very elevated gorges which are rarely if ever visited by men from the Ladak side.

* Khapalu and Nubra.

Memorandum on Mr. Blyth's paper on the Animals known as Wild Asses.—By Major R. STRACHEY, F. R. S. ; F. L. S.

In Mr. Blyth's recent paper on the Animals known as wild Asses, he states that "the late Prof. H. Walker referred the Tibetan *Kyang* to *EQUUS HEMIIONUS* of Pallas; and the *Ghor-khur* of this country is even more satisfactorily referable to *E. ONAGER* of Pallas, figured by Gmelin: but Prof. Walker committed the extraordinary mistake of figuring and describing an Indian *Ghor-khur* for a *Kyang*, so that the alleged distinctions which he has pointed out are valueless. However this mistake originated, there is no doubt whatever of the fact."*

Now I am in a position to say *quite positively* that Mr. Walker was right, and that Mr. Blyth is wrong, in the *matter-of-fact*. The animal in question was bought in my presence for the late Mr. Thomason for Rs. 100, at the fair at Bagesar in Kumaon, from a Tuhári Bhotiya by whom it had been got in Tibet. The story of its attachment to the pony, to which Mr. Blyth also alludes, is odd, and I will state it in full, with the hope that I may satisfy everybody that I really do know something of the personal history of Dr. Walker's *Kyang*.

Mr. Thomason paid a visit to Almora (the capital of Kumaon) at the end of 1847. I was there at the time, and so was my brother Mr. John Strachey. We heard of the *Kyang*, and Mr. Thomason having been informed of its existence, asked my brother to buy it for him, and to send it down to Calcutta to be forwarded thence to England to the Zoological Society. The animal was bought, as I before said. But on attempting to remove it from the place where it was tied up, it most flatly refused to stir, neither coaxing nor force was of any use. We were rather puzzled what to do, when on enquiry of its old Bhotiya owner, we learned that it had always been in company with a white pony for which it had a strong affection. It then occurred to us that if we got the pony too, the *Kyang* might be induced to follow where the pony led; and so it turned out. One or two attempts were made subsequently to surprise the *Kyang* into a more independent sort of existence, but it was of no use, and so the pony and he went off to Calcutta together.

* Journal Vol. XXVIII. p. 230.

The end of the pair was tragical. In a gale of wind off the Cape the Kyang died; and the Captain somewhat savagely threw the pony overboard alive, as his existence seemed no longer necessary after the Kyang's death.

Thus much as to the Kyang's identity. I must add, however, that although I am thus forced to show Mr. Blyth's mistake in this matter-of-fact, I in reality corroborate the force of his arguments as to the probable specific identity of the two Asses,—the Kyang and the Ghor-khur. It is obvious that Dr. Walker's description of a true Kyang, answers perfectly for a true Ghor-khur,—and as Mr. Blyth observes (though in a somewhat different sense), the alleged distinctions pointed out by Dr. Walker are probably enough valueless.

I have no pretensions to such a knowledge of Zoology or Anatomy as would make my opinion of any weight on the question of specific identity; but I may add a few words as to some of the more prominent features of the Kyang, having seen many of these animals dead and alive.

In the first place, my impression as to the voice of the Kyang is that it is a shrieking bray—not like that of the common Ass—but still a real bray and not a neigh. The differences of opinion on this point are easily reconcileable, I think, considering the inarticulate nature of the sounds.

As to the colour of the animal, it varies very greatly, and I think no dependence, as regards specific character, can be placed on mere depth of tint or brilliancy of hue. So also as to the dorsal and humeral stripes. The dorsal stripe is always plain. The humeral cross varies much, but is often as strongly marked as in the Ass bred in Kumaon, in which, however, it is not commonly very well defined.

I see nothing in the habits of the Kyang to make it improbable that it is, in fact, the same species as the Ghor-khur. The Kyang must be a very hardy animal to be able to live on the desert plateaus of Tibet; and though in winter the climate in which he exists is different enough from that of the plains of Sindh, yet in the summer the arid surface and scorching heat of the mid-day sun place the Kyang much more on a par with the Ghor-khur than might be supposed.

The Kyang, so far as external aspect is concerned, is obviously an Ass and not a Horse.

Report on some Fishes received chiefly from the Sitang River and its Tributary Streams, Tenasserim Provinces.—By ED. BLYTH.

A Report upon fishes which I drew up some months ago has gradually attained to such a length that it may be conveniently divided; and I shall therefore here confine attention almost entirely to fluviatile species, mostly collected by the late Major Berdmore in the Sitang river and its tributaries, with a few notices of new or little known species from the Gangetic streams and their outlets; reserving an extensive collection of marine fishes, collected principally at Port Blair, Andamán Islands, for a future occasion.

Fam. *Apogonidæ*.

AMBASSIS NOTATUS, nobis, *n. s.* Nearly similar to *A. LALA*, (Buchanan Hamilton), in form, but as large as *A. RANGA*, (B. H.), the mouth proportionally larger than in the latter and opening more distinctly upwards. Diameter of the eye nearly half that of the head. Body scales minute, but conspicuously visible to the unassisted eye; and the lateral line distinctly traceable throughout. In this genus, the first true dorsal spine is minute and fixed, pointing forwards (as in various Scomberoids), and the second or first moveable spine is generally reckoned as the first. Counting the moveable species only, the dorsal and anal rays are—

D. 7—1-13.—*A.* 3-14.

The first moveable spine of the anterior dorsal fin is $\frac{1}{4}$ the length of the second, and the third is a little shorter than the second. Of the anal spines, the first is but half the length of the second, which again is a little shorter than the third. Fins colourless. A silvery band on each flank, commencing from a large dusky humeral spot. Length $2\frac{1}{2}$ in. Sitang river.

A. LALA, (B. H.), var. A number of specimens of this fish sent by Major Berdmore are of small size, not exceeding $1\frac{1}{8}$ in. in length, and have the anterior dorsal fin infuscated and the posterior dorsal and anal fins margined with blackish, to an extent that I have never seen in Bengal specimens; but I can detect no difference in structure. Sitang river.

BOGODA INFUSCATA, nobis, *n. s.* A minute species (if adult), $\frac{9}{16}$ in. long by $1\frac{1}{8}$ in. deep *minus* the fins; with the tail much less forked than in *B. NAMA*, (B. H.), Bleeker; and of a dusky or infuscated hue, having silvery gill-covers and a greenish-silvery stripe on each side: fins paler than the body, with a blackish tinge on the anterior half of the first dorsal.

D. 10—1-10?—*A.* 3-8?

One specimen only, from the Mutla. Presented by Major W. S. Sherwill.

The following are the species of *Sciænidae* which have occurred to me in Lower Bengal: this being an estuary group, of which several of the species ascend into fresh water.

SCIENOIDES, nobis, *n. g.* Certain Asiatic species are here brought together, which do not range well (as hitherto) either in *SCLENA* or *OTOLITHUS*, but they approach nearer to *JOHNIUS*, from which they indeed chiefly differ in the comparatively small size of the eye. The jaws are of equal length, with dentition as in *JOHNIUS*; and the anal spine is short and feeble.

1. *SC. BIAURITUS*; *Otolithus biauritus*, Cantor. Common about the mouths of the Ganges, and not unfrequently brought to the Calcutta bazars. I have an impression that, many years ago, I forwarded specimens of this fish to the India-house by the *M.S.* name *Sciæna elongata*.

2. *SC. PAMA*; *Bola pama*, B. H.: *Sciæna pama*, C. V.* Exceedingly common, but I have never known it to exceed 2 ft. in length, and therefore believe that the examples “between four and five feet long” noticed by Buchanan Hamilton appertained to the preceding species, which is very similar in form of head, and moreover is unnoticed as a distinct species by Hamilton.

3. *SC. HARDWICKII*, nobis, *n. s.* A diminutive species, common at the mouths of the Gangetic rivers, which greatly resembles the

* The so-called ‘Whiting’ of Calcutta tables. At Madras the *SILLAGO ACUTA* is eaten for ‘Whiting;’ and I consider the Bengal species, *S. DOMINA*, to resemble the flavour of true Whiting much more than does the *SC. PAMA*, or ‘Bola’ fish. *S. ACUTA* occurs at the Sandheads, but I have never seen this species in the Calcutta fish-bazars.

SCIENA LUCIDA, Richardson, figured in the *Zoology of the Voyage of H. M. S. 'Sulphur,'* and is therefore probably that cited as figured in one of the unpublished drawings of Gen. Hardwicke in the British Museum, No. 130; the SC. LUCIDA inhabiting the Chinese Seas. The eyes, however, are smaller than in SCIENOIDES LUCIDA, the teeth more developed, the medial caudal rays are prolonged into a lengthened filament (which, however, may be characteristic of youth), and the fore-part of the back is smooth and spineless. It has also many more rays to the second dorsal and fewer to the anal fins.

D. 9—1.43—A. 2.7.

Length to end of caudal filament under 2 in., in all hitherto examined. Colour bright silvery with white fins.

4. SC. (?) ASPER, nobis, *n. s.* Another small fish common at the mouths of the Gangetic rivers, with body and fins like the last, but the back less elevated, and the anal spine considerably more developed. Mouth large, opening obliquely upward; the teeth moderate or rather small. Head with many prickles or spinelets, more or less developed in different individuals. Eyes placed high, near the plane of the forehead, on which two slight ridges—one from above each eye—meet behind upon the occiput at a somewhat acute angle. Some have a mesial spinelet, pointing a little backward, on and above the moveable and protrusile portion of the upper jaw, and another directed forward a little behind it: other spinelets, again, are seen (or more readily felt) on a raised line posterior to the eye, another upon each side of the occiput, and there are spinelets likewise at the margin of the pre-opercule.

D. 9—1.28. A. 2.6.

Colour silvery, the head brilliant silvery in the recent fish, with more or less of a nigrescent wash on the dorsal and the caudal fins, and numerous very minute dark specks near the ridge of the back, which are likewise seen in SC. HARDWICKII. Length mostly under 3 in.

5. OTOLITHUS MACULATUS, Kuhl and von Hasselt (nec apud Cantor). This is clearly the species described by this name in the *Histoire des Poissons*, with numerous black spots on the caudal and

second dorsal. It is occasionally, though rarely, brought to the Calcutta fish-bazars.

6. *O. SUBMACULATUS*, nobis, *n. s.*: *O. maculatus* apud Cantor? Spots few in number and comparatively large, ranged chiefly in two subregular lines, one bordering the second dorsal and the other bordering the lateral line above, with a few spots also bordering the lateral line below,—about 24 in all on each side: no decided spots on the fins; but numerous dusky specks on the dorsals, caudal, and a few on the anal: a purple spot or patch and below it a yellow one on each gill-cover. Mouth opening more decidedly upwards than in the other, so that the large canine-like teeth of the lower jaw point directly backward when the mouth is closed.

D. 9—1-31.—*A.* 2-11.

Length 7 in. by $1\frac{1}{2}$ in. in greatest depth of body. Two individuals only obtained in the bazar, within a few days of each other.

7. *O. BISPINOSUS*, Cuvier and Valenciennes. The fry common at the Sandheads, together with *SCLENOIDES HARDWICKII* and *SC.* (?) *ASPER*.

8. *JOHNIUS ANEI*, Bloch: *Bola coibor*, B. H. Common. Attains an enormous size, but the very large are seldom brought to the bazars.

9. *J. MACULATUS*, C. V.: *Sciæna maculata* (?), Gray, Hardw. *Ill. Ind. Zool.* (represented as without spots below the lateral line!) Accords minutely with the description in the *Histoire des Poissons*; and Russell's figure (No. 123) assigned to the same must therefore be faulty, especially in the form of the head above the eye, if intended to represent the same species. Once only obtained; two specimens.

10. *J. CATALEUS* (?), C. V. This also must be very faultily figured if Russell's pl. 116 is correctly assigned to it. It is not uncommon; and we have specimens from $4\frac{1}{2}$ to 21 in. long. It is thoroughly distinct from No. 9 (at least the species are so to which I have assigned the names). *Kāla Bola* of the natives here.

11. *J. CHAPTIS*; *Bola chaptis*, B. H. Common.

12. *J. SINA*, C. V. (Russell, No. 111). Rare.

13. *J. COITOR*; *Bola coitor*, B. H. Common.

14. *CORVINA CUJA*; *Bola cuja*, B. H. Common.

15. *LOBOTES ERATE*, C. V. Not rare. A particularly delicate fish for the table.

Of the foregoing fifteen species of *Sciænidae*, twelve have been obtained in the Calcutta fish-bazars, and only five of them are noticed by Buchanan Hamilton, though he appears to have confounded *SCIÆNOIDES BIAURITUS* with *SC. PAMA*.

A remarkable little fish obtained in the Calcutta fish-bazars may be designated —

URANOSCOPIUS ADHÆSIPINNIS, nobis, *n. s.*: having the ventral fins well separated apart, but each being connected along its whole inner edge to the skin of the abdomen, forming apparently an adhesive disk. Another curious character consists in a duplicature of the skin within the upper angle of the gill-cover, forming a sort of tube communicating with the gills when the opercle is closed. The anterior dorsal consists of ten almost detached spines, of which the first (which is close to the occiput) is longest. The upper part of the head is ridged, shewing angular interspaces or compartments, mostly of a squarish form: on the gill-covers are five distinct cross-ridges, and a sixth less distinct below. Above each lateral line is a series of prominent tubercles, and the lateral line is near to and runs almost parallel with the middle of the back. The ventrals reach as far back as the pectorals.

D. 10.—*14.*—*A.* 11.—*P.* 15.—*V.* 5.—*C.* 11.

General colour olive-brown, paler below, and whitish about the gill-openings, with all the fins blackish and obscurely mottled. Largest specimen obtained $2\frac{3}{4}$ in.; but the species doubtless attains a much greater size.

Fam. ——— ?

TOXOTES MICROLEPIS, nobis, *n. s.* Exceedingly like *T. JACULATOR*, but the scales conspicuously very much smaller, especially on the lower half of the body; the eye being also proportionally rather larger, and the body-markings much more developed, forming broken or discontinuous longitudinal bands. The fin-rays appear to be the same. From the Sitang river.

Fam. *Anabantidæ*.

COLISA VULGARIS, C. V. Sitang river.

Fam. *Zeidæ*.

MICROZEUS, nobis, *n. g.* A remarkable minute fish, which is little

else than an exceedingly diminutive ZEUS (the genus to which the British 'John Dory,' or *Jaune dorée*, is referred); and both in its uniform dark brown colouring,* and its remarkable great humeral spine, specially approximating the Z. PANGIO, C. V., of the Mediterranean, figured in the *Histoire des Poissons* (pl. 280). From the first dorsal, however, which commences at the middle or highest portion of the back, the outline of the head and body (as viewed laterally) describes a quarter of a circle, falling vertically at the mouth. The mouth, also, is not protrusile, but the lower jaw extrudes when it is open; both jaws being apparently furnished with a single row of minute teeth. No scales or lateral line discernible (and the latter would appear to be somewhat indistinct in the ZEUS PANGIO). The general shape is nearly as high as long, compressed; the head broader, and armed with a great tumid frontal casque, adjoining which are several distinct and prominent ovoid plates variously disposed, at the junction of two of which on the gill-cover and directly behind the eye, arises the great lateral spine, which, though directed backward, stands out from the sides of the body and is therefore particularly conspicuous when the fish is viewed from above or below. There are two dorsal fins, distinct though continuous at base; the anterior having spinous rays, and greatly resembling the corresponding fin of ZEUS PANGIO, only proportionally much smaller: all the other fins are distinct and well defined, but short and compact, with no rays elongated beyond the rest; tail slightly rounded, less so than in Z. PANGIO, and the ventrals are not elongated as in that species. No proper scales are discernible, but the body is uniformly studded with rough tubercles.

M. ARMATUS, nobis, n. s. A minute species, $\frac{3}{8}$ in. long *minus* the tail, by somewhat exceeding $\frac{1}{4}$ in. high *minus* the fins. As in various other Scomberoids, &c., there is a minute and concealed forward-directed spine (readily ascertained by the sense of touch) anterior to the first dorsal, which latter consists of ten moveable spines, of which the third is longest and the rest are successively shorter, followed by a distinct though conterminous fin containing about sixteen soft rays; the anal has three short spines, followed by about fourteen flexible rays; the ventrals have one spine and five or six soft rays;

* This, however, I since learn is only when preserved in spirit.

and the short pectorals have about fifteen rays; the caudal about seventeen.

D. 10-16.—*A.* 3-14.—*V.* 1-5 or 6.—*P.* 15?—*C.* 17?

From the diminutive size of the fish, it is difficult to count the fin-rays even with the help of a magnifier. The colour (in spirit) is uniform dusky-brown; but Major W. S. Sherwill, who discovered this species in the Mutla river during the month of May, swimming in shoals of about fifty each, in mid-stream during the height of the tide, assures me that about ten individuals of such a shoal were of a brilliant cobalt-blue colour, about twenty bright yellow, and the remaining twenty a rich brown,—differences no doubt of sex and of breeding condition.

Fam. *Macrogathidæ*.

MASTACEMBALUS, GRONOV. Of this genus we possess—1. *M. UNICOLOR*, K. et v. H.; from the Sitang;—2. *M. PANCALUS*, (B. H.); very common in Lower Bengal;—3. *M. ZEBRINUS*, nobis, *J. A. S.* XXVII, 281, from the Sitang, which some might consider to be a strongly marked race of the last;—and 4. *M. ARMATUS*, Lacépède (apud Cuvier); very common in Lower Bengal, and here varying chiefly in the markings being more conspicuously developed in the young. It is accurately figured by Buchanan Hamilton, and incorrectly coloured (so far as the Bengal race is concerned) in the *Histoire des Poissons*. Dr. Bleeker identifies with it *M. ponticerianus* et *M. marmoratus*, C. V., and also *M. undulatus*, McClelland. The last is from China, and it agrees sufficiently with some Bengal examples of the species, except that it is stated to have three spines anterior to the anal fin; but I have seen none resembling in its variegation the *M. marmoratus*, C. V., and *M. venosus*, Val., as figured in the Zoology of Jacquemont's Voyage, nor the *M. armatus* as figured by Sykes. Dr. Jerdon recognised three species in S. India, all of which were considered by him to be different from that of Sykes—viz. his *ponticerianus*, which is doubtless true *ARMATUS* of Bengal, with 78 dorsal and 72 anal rays,—his *marmoratus* with *D.* 84 to 87 and *A.* 90 to 92,—and his *malabaricus* with 74 of each; the number of soft rays in the first and second according with those given by Cuvier and Valenciennes. A Tenasserim race now sent is a little differently marked from *ARMATUS* of Bengal, and the fins

(including the pectorals) are minutely speckled: but I considerably incline to the opinion that all will prove to be slight varieties only of *M. ARMATUS*,—excepting, of course, the *UNICOLOR*, *PANCALUS* and *ZEBRINUS*,—the last two being again very nearly affined to each other.

Fam. *Gobiidæ*.

Genus *ELEOTRIS*, Gronov. Five species are more or less commonly brought to the Calcutta fish-bazars. Of these, one—*E. MACRODON*—has minute scales; two—*E. POROCEPHALUS* and *E. INCERTA* (*n. s.*)—have small scales (and the former is less frequently obtainable than the others); and there are two with large scales—*E. BUTIS*, (B. H., *v. humeralis*, Val.), and another which appears to be undescribed:—

E. BUCCATA, nobis, *n. s.* Affined to *E. CAPERATA*, Cantor, and at once distinguished by having a black spot at base of each pectoral fin, margined and dotted with bright gamboge-yellow. Scales larger than in *E. BUTIS*, (B. H.), a range of eight of them only from second dorsal to anal fins. The head very short, as high as broad, with a serrated ridge above each orbit, concave between the orbits and convex anteriorly above the mouth, with prominent sealed cheeks or præ-opercles; teeth small and uniform. In some specimens a series of dark transverse bands is distinctly traceable; one of them as broad as the first dorsal is long, the other being equal to the second dorsal: fins infuscated, more or less mottled, and the lower edged with yellow; the first ray of the second dorsal being elongated in some specimens.

D. 6-10.—*A.* 9.

Length 4 in. By no means a common species.*

E. CAVIFRONS, nobis, *n. s.* Affined to *E. MACRODON*, Bleeker, but the scales fully twice as large, all the fins much longer, and a remarkable depression between the eyes; also the same scaleless line or groove from the eye to the insertion of the præ-opercle, conspicuously developed, as is described of *E. MADAGASCARIENSIS*. Head one-fourth

* Though aware that Dr. Bleeker has subdivided the great genus *ELEOTRIS* (as it stands in the *Histoire des Poissons*), I have not seen his arrangement; but gather incidentally that *BUTIS* stands as the type of one group, and another distinct type of large-scaled species is exemplified by *E. CAPERATA* and *E. BUCCATA*.

of the total length: the pectorals reaching to the middle of the body. The lower jaw when closed exceeds in length and rises to the same plane as the upper; and in both jaws there is a row of larger teeth bordering the usual band of small teeth. Genital appendage rather long.

D. 6-10.—A. 9.

Colour greenish-albescent, much embrowned above; all the fins much speckled, the variegation shewing as numerous pale dots upon the caudal. Longest specimen $4\frac{1}{4}$ in. Port Blair, Andamán Islands.

E. INCERTA, nobis, *n. s.* This is a species very similar to the last, and which is commonly brought to the Calcutta fish-bazars; but I have not known it to exceed 3 in. (or at most $3\frac{1}{2}$ in.) in length, and the head is more than a quarter of the total length. In an example $3\frac{1}{2}$ in. long, the head to point of gill-cover measures $\frac{7}{8}$ in. In a few specimens—one or two thus characterized may generally be selected from two or three dozens—the curious feature occurs of a sharp reflected spine at the angle of the præ-opercle. In *E. BELOBRANCHIA*, C. V., such spines occur on two of the gill-rays. The groove from the eye to the angle of the præ-opercle exists, but the naked line is more contracted than in *E. CAVIFRONS*. Dentition as in the latter, but the teeth are proportionally smaller. Fin-rays the same. Colour dull olive-brown, the pectorals whitish and minutely speckled, having a dusky spot at their base above, which does not occur in *E. CAVIFRONS*: dorsals, anal, and caudal, infuscated, the second dorsal prettily speckled with whitish and the other fins less distinctly variegated. Length mostly under 3 in.

E. SCINTILLANS, nobis, *n. s.* A species with only eight rays to the second dorsal and 6 (or perhaps 7) to the anal fins. General aspect very much that of an *OPHICEPHALUS*. Form short, the head nearly a third of the total length. Colour dull pale green, infuscated above and at the sides, with an appearance of two black spots above and below at base of tail; all the fins being inconspicuously speckled. As seen in spirit, many of the scales have a brilliant golden sparkle. Length of only specimen $2\frac{1}{8}$ in. Port Blair, Andamáus.

E. FELICEPS, nobis, *n. s.* Species remarkable for the approximation of the eyes, which are separated by an interspace only one-fourth of the diameter of the orbit. Scales, as in the preceding species,

moderately small, or of about the same proportionate size as in *E. POROCEPHALUS*. Mouth unusually small. Form rather short, with the head nearly a fourth of the total length. Rays of the first dorsal elongated into slight filaments. Ten rays in the second dorsal, and eight in the anal fins. Colour albescent-greenish, with numerous obscure and more or less confluent dusky spots on the sides (as best seen through a magnifier): all the fins being somewhat faintly variegated. Length of only specimen 2 in. Port Blair, Andamán.

I have introduced these Andamán species whilst treating of this genus; but the species of true *Gobius* thence received are very numerous, and, for the most part, are difficult to determine. An extraordinarily beautiful Goby of which I obtained a single specimen, some months ago, in one of the Calcutta fish bazars, appears to be the

G. VIRIDIPUNCTATUS, C. V. The fresh fish had a double row of brilliant greenish-cærulean large spots or patches on each side, which immediately and completely disappeared when it was put into spirit. Length $5\frac{1}{2}$ in.

AMBLYOPUS CIRRATUS, nobis, *n. s.* A large and remarkable species, much shorter in proportion to its thickness than *A. HERMANNIANUS*, having the dorsal and anal fins much more elevated than in that species, and the pectorals also considerably broader; with the tail-fin quite distinct from the dorsal and anal, though connected at their extreme base only, the tail being broader and much less attenuated at tip than in the other; with eyes undiscernible in an adult preserved in spirit, but a pit in the centre of the face, and numerous flat lobes of skin around and about it; also with seven flat and pointed cirri about the symphysis of the lower jaw; and with the mouth more strongly reverted than in *A. HERMANNIANUS*, having all the teeth black at base.

D. 5-42.—*A.* 44.—*P.* 13.—*V.* 1-5.—*C.* 15.

Length of specimen 9 in.; and body $1\frac{1}{2}$ in. deep posterior to the vent. A single example of this very strongly marked species was found among a lot of duplicates of *A. HERMANNIANUS*: origin unknown, but probably obtained in the Calcutta bazar.

PERIOPTHALMUS PAPILIO, Bloch, Schn.: *P. fuscatus*, nobis, *J. A. S. XXIII*, 271 (the young). Agrees essentially with M. Valenciennes' figure of a species which he refers to *P. PAPILIO* from the W. coast

of Africa; but the tail is obliquely truncated underneath, as usual in the genus; and the high anterior dorsal fin is of a dusky plumbeous colour, with a conspicuous black margin which again is slightly fringed with white; there is ordinarily, however, no second white line below the black, as figured by M. Valenciennes, though I have found this in two small specimens, and the lower portion of the fin is often conspicuously speckled with white. General colour of the body fuscous above, subdued white beneath, the gill-covers more or less spotted with white, and rudimentary short transverse bands passing up from the white of the belly; neutral and anal fins white, the pectorals and caudal a little speckled. Length 5 in.; height of anterior dorsal fin $1\frac{1}{4}$ in. in the finest examples. Common at Port Blair, Andamán islands.

P. 7—*RADIATUS*, (B. H.) Tenasserim and Calcutta specimens undistinguishable.

P. 13—*RADIATUS*, (B. H.) Ditto. The rays of the first dorsal vary from 11 to 13 in the males, and in the females this fin is either wanting altogether, or commonly so minute as to be discerned with difficulty, while in some examples five short rays are readily perceptible. Occasionally in the males the first or lengthened ray of the anterior dorsal is white to its base, and sometimes the second ray also. Mostly under $3\frac{1}{2}$ in. in length.

BOLEOPHTHALMUS INORNATUS, nobis, *n. s.* A small species perhaps, with proportionally small mouth, the gape barely reaching to between the eyes; of a greenish colour, with about ten dark transverse bands, in general not very distinct; with colourless fins, excepting the two dorsal, the membranes of which are minutely speckled with black (as seen through a magnifier); the first dorsal being not more elongated than the second.

D. 5-22.—A. 22.

Our largest specimen measures 3 in. long, but is probably not full-grown. Tenasserim.

Fam. ——— ?

NANDUS MARMORATUS, C. V.: *Coius nandus*, B. H. Tenasserim. Common in Lower Bengal.

Fam. *Siluridae*.

BAGRUS LEUCOPHYSIS, nobis, *n. s.* A restricted *BAGRUS*, of very

remarkable colouring; the head and fore-part of the body being bright silky-white above, studded with minute pores (as best seen under a magnifier). Maxillary cirri reaching to the end of adipose dorsal. Teeth and palatal band of them as usual in the genus. Eyes one-third of the vertical diameter of the head, and the two separated by an interspace equal to the orbit. Occipital process nearly as in *B. GULIO*, (B. H.) First dorsal spine short and triangular; the second elongated, moderately slender, and pectinated behind for its terminal third; the next two soft rays being longer than the spine. Pectoral spines very strongly pectinated behind. Adipose dorsal fin elongated longitudinally. Tail strongly forked.

D. 2-7.—*A.* 10.—*P.* 1-9.—*V.* 6.—*C.* 17.

Fins chiefly black, the rays of the first dorsal pale. Adipose dorsal pale and yellowish, studded with minute dusky specks, and having a slight dusky border. Base of ventrals yellowish, and an admixture of this colour on the pectorals, anal, and caudal. Body chiefly of a dark chocolate-brown, passing to silky-white anterior to the dorsal spine.* Largest specimen $5\frac{1}{2}$ in. long, $1\frac{1}{4}$ in. high at the dorsal spine, and length of dorsal spine $1\frac{1}{16}$ in. From the Sitang and other Burmese rivers.

B. TENGARA, (B. H.), *var.* Merely differs from *B. TENGARA* of Bengal by having constantly a strongly marked black spot near the tail, similar to the pectoral spot in both races. Tenasserim.

B. CAVASIUS, (B. H.), *var.* Differs only from the Bengal race by having a very distinct black mark at base of the dorsal spine, and in some individuals a distinct black spot also on the operculum,—markings which are only indicated in Gangetic specimens. Tenasserim.

BATASIO, nobis, *n. g.* A *Bagroid* form well worthy of distinction; comprising a number of small species with round and prominent muzzle, and the contracted mouth opening from below: with eight, or sometimes (?) six, cirri, which are very short, the maxillary cirri scarcely passing the eye in some. Palatal band of teeth continuous with the mass of maxillary teeth, or separated only by a slight groove. Rest as in *BAGRUS* (*verus*).

* This white recalls to mind that of the male of *HEPIALUS HUMULI*, an insect commonly known in England as the 'Ghost-moth.'—In the recent fish, the colour of the lower parts should be green, according to a communication just received from Major Tickell.

Type. B. BUCHANANI, nobis ; *Pimelodus batasio*, B. H.

B. AFFINIS, nobis, *n. s.* Exceedingly like B. BUCHANANI, as described by Buchanan Hamilton and as figured in one of his unpublished coloured drawings ; whereas his published figure (*F. G.* pl. XXIII. f. 60,) refers to his *Pimelodus careio*, which is a true BAGRUS with moderately long maxillary cirri :—but having 12 instead of 16 anal rays, no distinct longitudinal black stripe on each side of the body, but a tendency to shew three or four broad cross-bands, more or less distinct, besides a round black spot near the gill-covers, as in the other. The first dark band proceeds obliquely downward from the fore-part of the first dorsal, to some distance below the lateral line ; and posterior to this first band are obscure traces of three or four others, the last at base of tail. On the membrane of the dorsal fin is a large blackish spot, consisting of minute dark specks. Maxillary cirri scarcely passing the eye ; the two inferior pairs of cirri minute. Length $3\frac{1}{2}$ in. by $\frac{3}{4}$ in. high, of dorsal spine $\frac{1}{16}$ in., and of maxillary cirri under $\frac{3}{8}$ in. Tenasserim.

To the same type, but with shorter adipose dorsal, appertain the TENGANA, CHANDAMARA, and RAMA of Buchanan Hamilton. B. CHANDAMARA is referred to SILUNDIA by M. Valenciennes, and is described by Hamilton to have only two cirri ; but his unpublished figure represents six cirri distinctly, and in all this group the minute cirri are discernible with difficulty and are extremely liable to be overlooked. The BAGRUS CAPENSIS of Sir A. Smith's 'Illustrations of S. African Zoology' would appear also to be referrible to this particular division.

Of the well marked type exemplified by BAGRUS SONDAICUS and B. DOROIDES of Valenciennes, Dr. Bleeker constitutes his genus HEXANEMATICTHYS. The latter species, however, I consider to be—

H. SAGUR ; *Pimelodus sagur*, B. H. : *Bagrur doroides*, Val. For a few days, in the month of March, 1859, several specimens were brought to the Calcutta bazar ; and the largest obtained by me was $22\frac{1}{2}$ in. long, with dorsal spine $2\frac{3}{4}$ in., and pectoral spines $3\frac{3}{8}$ in. ; the membrane prolonged into a short filament beyond the spines : the latter are granulose, striated, with a regular series of tubercles in front, which are round on the pectoral spines and *omega*-shaped on the dorsal. Maxillary cirri reaching back to beyond the posterior

base of the pectorals, as far as the tip of the triangular granulose bone above the pectorals and behind the gill-cover. Osseous plate broad, and uniformly granulose almost to the ventrals; the second plate, anterior to the base of dorsal, large and bilobate or *saddle-shaped*. A series of granulose ossicles continued along the lateral line, nearly as far as the posterior base of the dorsal fin. Colour uniform livid plumbeous above, spotless pearly-white below: a series of transverse dull silvery bands, each with a row of pores along its anterior margin,* above the lateral line: no dark spot on adipose dorsal; the membrane of anterior dorsal pale, and of the other fins purple-black. Eyes moderate, with yellow irides.

Another type is rightly discriminated by Dr. Bleeker by the name CEPHALOCASSIS, comprising species both from the Old World and the New. Among them are —

C. SONA; *Pimelodus sona*, B. H.: *P. auratus*, B. H., MS.: *Bagrus arioides*, Val.

C. GAGORIDES; *Bagrus gagorides*, C. V.; *Pimelodus gagora*, B. H. (in part), vide *J. A. S.* XXVII, 285.

C. TRACHYPOMUS; *B. trachypomus*, C. V.; which I am now satisfied is distinct from GAGORIDES, though I have not obtained it. Indeed, the *habitat* of this fish is not stated.

ARIUS is restricted by Dr. Bleeker to the type exemplified by *P. arius* and *P. gagora*, B. H., with two groups of blunt teeth on the palate. The following also belongs to it.

A. JATIUS; *Pimelodus jatius*, B. H. Stated to have no palatal teeth; and certainly they are not always discernible in the recent fish.† But in most fresh specimens, and always soon after death, or in the dry skin, two oblique oval masses of round tubercle-like teeth are seen, very far back on the palate, and a few similar teeth detached from the others by a long interval are placed in two small lateral masses nearer to the card-like maxillary teeth. General aspect of A. GAGORA, but with the face anterior to the eyes considerably longer: maxillary cirri reaching only to the white spot on centre of

* These are difficult to discern in the dry skin.

† In a description which I took from the first specimen obtained, I underlined the statement that it had no palatal teeth.

forehead. Dorsal and pectoral spines resembling those of *A. GAGORA*, being of the same proportional length and thickness but less distinctly pectinated behind. Cephalic plate much less uniformly tuberculated than in *A. GAGORA*, and considerably more grooved or lineated and having fewer tubercles anteriorly: small bony crescent anterior to the dorsal spine prolonged on either side to a point, and tuberculated only in the middle. Colour lurid, passing to silvery on the sides below the lateral line, and white underneath; the fins also white, and a black spot on the adipose dorsal: irides pearly-white: mouth small and of a yellow colour. The largest specimen obtained is 29 in. long, with dorsal spine $4\frac{1}{2}$ in. This species is but occasionally brought to the Calcutta fish-bazars, and generally more or less stale and unfit for preservation, as if not taken in the immediate neighbourhood.*

GAGATA, Bleeker. This, as it now stands, is a heterogeneous assemblage of species, and I know of none that can properly range with the type of it, which is *Pimelodus gagata*, B. H.: a species with the maxillary cirri bony towards the base, as in *BAGARIUS* to a much greater extent. The *MENODA* dubiously referred to this type by Dr. Bleeker is identical with *Bagrus corsula*, Val., which therefore must stand as *B. MENODA*, (B. H.); the *MANGOIS* appertaining to my genus *AMBLYCEPS*; and another type may be here indicated as—

HARA, nobis, *n. g.* With broad maxillary cirri, soft throughout, and annulated with two colours: the pectoral spines short, flat, and pectinated on both edges; the dorsal spine less stout, serrated on both edges or behind only: mouth small, terminal, but opening below: head flattish, with small eyes placed high: a band of card-like palatal teeth. Colouring dark and minutely mottled.

Type. *H. BUCHANANI*, nobis; *Pimelodus hara*, B. H.

H. FILAMENTOSA, nobis, *n. s.* Very like *H. BUCHANANI*; but having a long filament continued from the upper segment of the caudal fin. The markings are difficult to describe, from their intricacy; but two

* To the list of *Siluridiæ* obtained in the Calcutta bazars, published in Vol. XXVII, p. 283 *et seq.*, have accordingly to be added—

HEXANEMATICHTHYS SAGUR, (B. H.)

ARIUS JATIUS, (B. H.): as also

CHACA LOPHIODES, Val.: *Platystaca chaca*, B. H.

irregular speckled-whitish transverse bands are constant, preceded each by a blackish band, the first white band being anterior and the second posterior to the adipose dorsal; a row of whitish spots on the membrane of the dorsal; two dark bands, one of them basal, on the ventrals; and a black band at base of anal fin. Length 3 in.; of caudal filament 1 in. more. Tenasserim.

To this genus must also be referred the (*Pimelodus*) *CONTA*, B. H., with a deeply furcate tail, the upper lobe of which is longer and more attenuated; as also the (*P.*) *CARNATA*, Jerdon, and the (*P.*) *ASPERA*, McClelland, *C. J. N. H.*, IV, 404, and pl. XXIV, f. 2.

Another distinct type occurs in the (*P.*) *CENIA* and (*P.*) *VIRIDESCENS*, B. H. These are referred doubtfully by Dr. Bleeker to his *HEMIPIMELODUS*; as also (*P.*) *JATIUS*, B. H., which is a true *ARIUS*, as already shewn. If the *Nallah Jellah* of Russell (pl. CLXX) be a proper *HEMIPIMELODUS* as assigned by Dr. Bleeker, then the *CENIA* group is quite distinct; and the (*P.*) *TELCHITTA*, B. H., again, represents a special type with additional species in S. India.

AMBLYPEPS, nobis, *J. A. S.* XXVII, 281. Type *AMB. CÆCUTIENS*, nobis, *ibid.* ('*Cobitis*-like Siluroid,' XXIV, 712). To this genus should be referred the (*Pimelodus*) *MANGOIS*, B. H., figured among his unpublished drawings; but the form is rather less elongated, the tail more sharply forked, the eyes (to judge from the drawing) more distinct, and the adipose dorsal better defined and less distant from the first dorsal, than in *A. CÆCUTIENS*.

A. TENUISPINIS, nobis, *n. s.* A third species, distinguished by the slenderness of its short dorsal and pectoral spines, and also by the fineness of its eight cirri: eyes minute and difficult to be distinguished: adipose dorsal indistinct and pointed posteriorly: six soft rays to the dorsal and nine to the anal, the first of the latter being short and the next two successively longer. Colour uniform dark greenish olive-brown. The lateral line wanting in all the species. Length 2 in. A single specimen procured at Gházipur by Dr. Jerdon, and presented by him to the museum.

GLYPTOSTERNON, McClelland. It appears that as many as four very distinct generic types have been brought together under this name by Mr. McClelland, in the five species which he has described

in the second volume of the *Calcutta Journal of Natural History*, pp. 584-8.

The species first described by him is his *GL. RETICULATUS*, from Afghánistán. It is stated to be "without spines; the first ray of the pectoral and ventral fins soft and pinnate, giving off soft pointed cartilaginous rays along the anterior margin, which are enveloped in the membrane of the fin. *The under surface of the head and of the anterior portion of the body forms a flat corrugated surface.*" Gill-covers —? Cirri —? This form will remain as typical *GLYP-TOSTERNON*.

A second type (*PSEUDECHENEIS*, nobis, *n. g.*) is figured and very unsatisfactorily described as *GL. SULCATUS*. All that is stated is—"An oval disk on the breast between the pectorals, composed of *transverse plates* as in the *Remora* (*ECHENEIS*), and a series of similar plates on the broad lower surface of the first rays of the ventrals." No mention of spinous rays: and from the figure published it is doubtful if the gill-coverings are visible from below. Adipose dorsal distinct and well developed. Mouth figured as small, subterminal; with tolerably developed maxillary cirri; the six other cirri small.

"*D.* 8.—*A.* 9.—*P.* 13.—*V.* 7.—*C.* 16."

The third type is that of his *GL. STRIATUS* and apparently his *GL. PECTINOPTERUS*, respectively from the Khásya hills and the vicinity of Simla. We have what appears to be the former from Dorjiling; also another species from the same locality, but in too imperfect condition to permit of a description being taken of it. A fine third species likewise from the Tenasserim provinces. This type may be denominated

GLYPTOTHORAX, nobis, *n. g.* Mouth subterminal, large, with a band of card-like maxillary teeth above and below: gill-openings large, and nearly meeting below; and behind them a pectoral adhesive disk grooved longitudinally. Maxillary cirri rather large, with a concealed spinelet at their base; the six other cirri moderate. Adipose dorsal distinct and well defined; the anal fin moderate or somewhat large. Dorsal spine well developed, smooth, feebly pectinated behind towards its tip; the pectoral spines broad and flat, and strongly pectinated behind: a distinct spinous base also to the first ventral ray.

GL. TRILINEATUS, nobis, *n. s.* Typical in structure, and of a

blackish colour, with three longitudinal yellow lines, one along the entire ridge of the back from occiput to base of tail, the others along each lateral line. Dorsal spine two-thirds of the length of the first soft ray. Lobes of the fureate tail subequal, the lower rather the larger and longer.

D. 1-7.—*A.* 12.—*P.* 11.—*V.* 6.—*C.* 15.

The chief structural difference from *GL. STRIATUS* consists in its having three more rays to the anal fin. Length $5\frac{1}{2}$ in. Tenasserim.

The fourth type is very distinct in the form of the mouth, and has remarkably small gill-openings which are visible only from above. I term it

EXOSTOMA, nobis, *n. g.* Otherwise generally similar to *GLYPTOTHORAX*, but with no pectoral disk, the dorsal spine exceedingly slender (if always present?), and the eyes somewhat larger. "Lips reflected and spread continuously round the mouth, so as to form a broad flat sucker." Two distinct lateral lobes of minute eard-like teeth, both above and below, reflected much apart, and having an obviously suctorial centre. Only one pair of lower cirri, situate at the posterior corners of the reflected lower or hinder lip: the entire lower-parts smooth and flat. Anal fin small; the adipose dorsal lengthened but very slight and low, extending nearly to the caudal.

EX. BERDMOREI, nobis, *n. s.* Maxillary cirri reaching beyond the base of the pectoral spines, and no distinct spinelet at the base of the latter; but a spinous base to the first ray of the ventrals: lower caudal lobe much broader and longer than the upper.

D. 7.—*A.* 6.—*P.* 1-10.—*V.* 1-5.—*C.* 14.

Colour dingy olive-brown, with obscure broad dark bands, presenting more or less of a clouded appearance; the fins mostly darker: below pale. Largest specimen 4 in. Tenasserim.

EX LABIATUM; *Glyptosternon labiatum*, McClelland. Dorsal described to be "perfectly soft and free from spines and bristling points; cirri very short." No notice of the colouring. From the Mishimi hills, E. Asám.

Dr. Bleeker refers the (*Pimelodus*) *NANGRA*, B. H., to *GLYPTOSTERNON*; but this I cannot understand. *Vide* Hamilton's published figures. He also gives a *GL. PLATYPOGON*, (K. et v. H.), from Java

and Hindustan, and a GL. PLATYPOGONOIDES, Blkr, from Sumatra; both of which appear to fall under GLYPTOTHORAX, nobis, *ut supra*.

EUTROPIUS MACROPHALMOS, nobis, *n. s.* Of the usual form of this genus, but with remarkably large eyes, that occupy more than half of the height of the head. Longer maxillary cirri reaching to the vent, the four inferior cirri to base of pectorals: spines slender, the pectoral less so, and all minutely pectinated behind; the dorsal also jagged in front for its basal half.

D. 1-7.—*A.* 47 to 54.

Colour bright silvery, infuscated along the back, with a golden lustre on the gill-covers. Soft rays of the dorsal and pectorals infuscated except at base; also the medial portion of the deeply forked caudal, while several outer rays of the caudal above and below are white throughout. Ventrals and anal white: the slender adipose fin having minute dusky spots. Longest specimen $6\frac{1}{2}$ in. Tenasserim.

SILURICTHYS BERDMOREI, nobis, *n. s.* Maxillary cirri reaching to base of ventrals, the inferior to base of pectorals. The upper jaw slightly longer than the lower. Eyes small. Dorsal fin slight and slender, but seeming to consist of three or four rays. Pectoral spine short, only half of the length of the fin.

D. 3 or 4.—*A.* about 65. *P.* 1-13.—*V.* 11.—*C.* 17.

Anal continuous with the caudal, but distinctly defined. General colour dull olive-brown, paler below. Length of specimen $4\frac{3}{4}$ in., by $\frac{3}{4}$ in. deep at dorsal. Head $\frac{3}{4}$ in. Tenasserim.

PSEUDOSILURUS MACROPHALMOS, nobis, *n. s.* General form of Ps. TABDA, (B. H., *microcephalus*, Blkr), but proportionally less deep and more elongated, with eye of twice the diameter, and the lower jaw closing evenly with the upper, or very nearly so, though protruding when the mouth is open; maxillary cirri much longer, reaching far beyond the more developed pectorals; the anterior bands of teeth above and below much less broad, and the palatal teeth reduced to two straight and well detached transverse patches.

D. 4.—*A.* 75.—*P.* 1-13.—*V.* 7.—*C.* 19 or 20.

Colour dull silvery, much embrowned, especially above, with a greenish tinge, probably more decided in the recent fish. Length of specimen $9\frac{1}{4}$ in., by $1\frac{3}{8}$ in. in a vertical line from dorsal to ventral; head $1\frac{1}{2}$ in.; pectorals $1\frac{3}{8}$ in.; maxillary cirri $3\frac{1}{2}$ in., becoming

extremely fine towards the end. A large round dark spot on each side, situate on the lateral line, a little anterior to the dorsal fin. Tenasserim.

Fam. *Cyprinidæ*.

BARBUS CAUDIMARGINATUS, nobis. *n. s.* One of those *SYSTEMI* (for such they essentially are) which, having four barbules or tentacles, are currently assigned to the great and comprehensive genus *BARBUS*: such are the *B. GORDONIDES* and *B. CHRYSOPOMA* figured by Valenciennes, and the *B. SARANA*, (*B. H.*), Val., which is *S. immaculatus* as described by McClelland.* In the present species the barbules are well developed, the form less deep than usual in the particular group, the principal dorsal spine robust and passing into a soft ray for its terminal fourth, being finely pectinated behind, and preceded by three distinct spines, the first very minute. About 32 scales on the lateral line, and ten longitudinal series of scales.

D. 4-8.—*A.* 7 (the last divided).

Colour silvery, above darker and greenish; with an irregular vertical black mark behind the gills, and broad black upper and lower margins to the caudal fin; the rest of the caudal, with the ventrals and anal, bright crimson (which soon disappears in spirit). Length 4 in., by $1\frac{1}{8}$ in. from dorsal to ventrals. Vertical diameter of the eye fully half that of the head. Irides pale golden. Tenasserim provinces.†

CAPOETA MACROLEPIDOTA (?), K. et v. H. Specimen 2 in. long. No serrature discernible on the dorsal spine, and I distinguish seven anal rays. The late Dr. Cantor gives this species as inhabiting the Tenasserim provinces; and it and *LEUCISCUS RASBORA* are the only

* His figure (*As. Res.* XIX, II, Pl. XL, f. 5), I take, from the colouring, to represent a common species of *SYSTEMUS* with one pair of very minute tentacula, otherwise resembling *S. SOPHORE* except in the absence of markings. For this the name *IMMACULATUS* might be retained. It grows to about double the size of *S. SOPHORE*.

† 'Black and red-tailed *Systemus*' of the Rev. F. Mason's 'Natural Productions of Burma.' Several species are indicated in this work, as *ROHITA VULGARIS*, *R. CALBASU*, and *R. NANDINA*; also a large Barbel allied to *B. TOR*, (*B. H.*), which he terms *B. MORTONIUS*; and a mountain Barbel with minute scales, of the *OREINUS* group, which requires examination.

Cyprinidæ which are included in his Catalogue of Malayan fishes. Tenasserim.

Genus *OSTEOBRAMA*, Heckel. Comprising certain Bream-shaped Carps with minute scales, as exemplified by the (*Rohtee*) *VIGORSII* and (*R.*) *OGILBII* of Sykes, and the (*Leuciscus*) *ALFREDIANUS* of Valenciennes.* Dr. Bleeker includes them in *SYSTEMUS*.

O. MICROLEPIS; *Systomus microlepis*, nobis, *J. A. S.* XXVII, 289. ('Tenasserim Bream' of Mason.) A specimen obtained by Mr. Atkinson at Maulmein; and I am now certain that the example formerly described is also from Maulmein, having been sent many years ago by the Rev. F. Mason. Colour silvery-ash above the lateral line, white below it, and a semi-obsolete large blackish spot near base of tail: fins white, a little tinged with yellow; and the irides apparently pale golden. From analogy with kindred species, it is probable that this fish attains a weight of 3 or 4 lbs.

O. COTIS; *Cyprinus cotis*, B. H.; *Abramis cotis* apud McClelland; *Leuciscus alfredianus* (?), Val. A Tenasserim specimen 3 in. long accords with the description, excepting in having but 32 instead of 35 rays to the anal fin.† The second dorsal ray is spinous, but very slender, and is conspicuously serrated on the hind-edge. In lieu of the row of four dots close under the lateral line and immediately behind the gill-cover, figured by Buchanan Hamilton, are four scales of the lateral line having remarkably large tubes; and most of the soft rays of the dorsal are marked anteriorly with black, and the rays of the anal are spotted with the same anteriorly, as seen with the help of a magnifier. The merest trace of a slight dark spot in front of the dorsal fin.

* Figured in the *Histoire des Poissons* by this name; but described as *L. Duvaucelii* (by which appellation a species of *SYSTEMUS* is also described and figured),—having "le premier rayon de la dorsale forte et un peu dentelé." From Nipal. It appears that three divisions of these spined Bream-carps are recognised by Heckel, bearing the names *ACANTROBRAMA*, *OSTEOBRAMA*, and *GLOSSODON*. I am unacquainted with the distinctions; but find that *ROHTER OGILBII*, Sykes, is assigned to *OSTEOBRAMA*, as is likewise the (*Cyprinus*) *COTIS*, B. H. *Vide* Hugel's *Fauna von Kaschmir*, p. 392.

† McClelland also counts 32 rays. (*As. Res.* XIX, II, 588). But Valenciennes counts 36 in his *ALFREDIANUS*.

SYSTEMUS (?) MACULARIUS, nobis, *n. s.* Affined to the preceding in shape of head: the muzzle unusually prolonged anterior to the nostrils, where shewing a considerable concavity above. Body less deep than usual; its lower outline continued straight to the base of the anal fin. Principal dorsal spine unusually large in every way, and strongly pectinated behind: anterior to it are distinctly three others, the first very minute: large anal and first ventral spines passing gradually into soft rays towards their tips. Series of 35 or 36 scales along the lateral line, and of 12 obliquely downward from base of dorsal spine.

D. 4-8.—*A.* 3-6.—*P.* 17.—*V.* 1-8.—*C.* 21.

Colour pale olivaceous, deeper on the back; each scale having a distinct shining blackish spot at tip, less conspicuous on the browner scales of the back; fins pale; the tail well forked. Length 6 in., by $1\frac{1}{2}$ in. high in the body; of principal dorsal spine *plus* $1\frac{1}{4}$ in. Tenasserim.

S. DUVAUCELII; *Leuciscus Duvaucelii*, Val., *II. P.* pl. 491. Tenasserim.

S. PHUTONIO, (? B. II.) Five specimens, averaging $1\frac{3}{4}$ in. long, a trifle more or less.

D. 2-8.—*A.* 1-6.

Fins spotless. A transverse black bar on the medial third of the body, above the middle of the pectorals, and a broader black transverse bar towards the tail, appearing generally as a round spot that had *run* more or less above and below. From Maulmein. What appears to be the same fish in Lower Bengal, I have never obtained more than $1\frac{1}{8}$ in. long, and the anterior transverse streak is invariably longer and better defined, occupying the medial two-fifths of the depth of the body above the middle of the pectoral fins. The fins of the Tenasserim fish seem also to be proportionally larger.

S. (?) UNIMACULATUS, nobis, *n. s.* Species much resembling in outline the LEUCISCUS COSUATIS, (B. H., as figured by McClelland by the name *Systemus maculatus*, *As. Res.* XIX, II, pl. XLIV, f. 9), but the scales are proportionally smaller, and there are three distinct spines to the dorsal fin, the principal one being very slender, smooth or unserrated, and those of the anal barely recognisable as such. Colour pale silvery-brown, with one great black spot on the dorsal

fin towards its base. Lateral line very indistinct from below the commencement of the dorsal.

D. 3-8.—A. 2-5 ?

About 24 scales longitudinally, and 8 or 9 obliquely downward from the dorsal. Largest specimen but $1\frac{3}{8}$ in. Tenasserim.

Genus *PLATYCARA*, McClelland (as originally founded on his *PL. NASUTA*, which is a large-scaled Cyprin altogether distinct from *BALITORA* of Gray, which Mr. McClelland most unaccountably unites with his *PLATYCARA*)* *Bangana*, Gray (*nec* B. Hamilton); comprising *Discognathus*, Heckel; and the more typical Indian species doubtfully referred to *LOBOCHEILUS* by Dr. Bleeker. A genus of Gudgeons inhabiting mountain rapids, the more characteristic species having a great transverse cleft on the face studded with large tubular pores, and also an adhesive disk to the lower lip,—which group Mr. McClelland referred to *RICNORHYNCHUS* (as adopted by him), without perceiving that his *PLATYCARA NASUTA* and also his *PL. LISSORHYNCHA* strictly belonged to it, equally with other species which he has figured in *As. Res.* XIX, pl. LIII, in some of which the face is smooth and not cleft and the labial disk is greatly reduced, as illustrated also by the *Discognathus fusiformis*, Heckel, of Baron Hugel's *Fauna von Kaschmir* (p. 378). As examples of the more typical form may be cited the *Cyprinus (Bangana) falcata* and *C. gotyla*, B. H., of Hardwicke's *Illustrations of Indian Zoology*: but all shew a strong tendency to the *BALITORA* form of pectorals; all that I have seen having likewise large ventrals, and the backward position of the mouth which opens downwards, and fimbriated anterior lip, seem to be of constant occurrence. The cleft and tubercular face occurs in another type, exemplified by the *GOBIO RICNORHYNCHUS* of McClelland, which (so far as I know at present) stands quite alone, as a particular type worthy of a special designation.† The

* *J. A. S.* VII, 947, and pl. LV, fs. 2, *a* and *b*; copied into *As. Res.* XIX, pl. LVII, f. 2, with *a* and *b*. The mistake of uniting these two incongruous genera is repeated in *Calc. Journ. N. H.*, Vol. II, p. 587, and pl. XVI; where a species of the mountain type of Gudgeon is described and figured as *PLATYCARA LISSORHYNCHA*, and a true *BALITORA* as *PL. ANISURUS*!

† Perhaps true *LOBOCHEILUS*? It approximates the *TYLORHYNCHUS*, Heckel, but the duplication of the lips and great chin-pore are peculiar. To *TYLOG-*

extremes of the present genus are connected by intermediate gradations, of which the *PL. NASUTA* of McClelland presents a good illustration.*

A highly typical species, with every character developed in the utmost degree, may be designated—

PL. NOTATA, nobis, *n. s.* Easily recognized by having five conspicuous black spots on the base of its dorsal fin. Four labial cirri, the hindmost liable to be overlooked. Scales on lateral line 33, and 8 from dorsal to ventral: the dorsal rather high and falcate anteriorly. Ventrals as large as the pectorals, and somewhat falcate; the anal more decidedly so.

D. 10.—*A.* 7.—*P.* 15.—*V.* 9.—*C.* 20.

Colour dusky olive-green above and on the sides, beneath buffy-albescent. Base of the dorsal fin whitish, setting off a series of black spots, larger anteriorly and the hindmost generally obsolete; rest of the fin a little nigrescent. One or more spots also at base of the anal fin. Pectorals somewhat yellowish at base, then blackish: a dusky line along each longitudinal row of scales becoming gradually visible towards the tail. Length 6 to 6½ in. Tenasserim.

The next has a smooth muzzle and almost rudimentary disk.

PL. LATIUS; *Cyprinus latius*, B. H.: *Gonorhynchus macrosomus*, McClelland. Tenasserim.

LABEO CURCHIUS; *Cyprinus curchius*, B. H. What I take to be this species accords with the fin-ray formula assigned by McClelland (*As. Res.* XIX, II, 328); but I count only about 64 (instead of 78) rows of scales along the lateral line, and but 17 or 18 (instead of 30) rows from dorsal to ventrals. No proper “stripe along the middle

NATHUS, Dr. Heckel refers the *Varicorhinus diplostomus* of the *Fische aus Caschmir*, by the new specific name of *Valenciennesii*; and the *Barbus diplocheilus* of the same work is now his *T. BARBATULUS*. A third species, from the Bombay Presidency, is also described by him as *T. PORCELLUS*. (Vide *Fauna von Kaschmir*, pp. 376, 378, and 385). The true *VARICORHINUS* of Rüppell has spines to the dorsal fin; wherefore *V. bobree* of Sykes also cannot properly be retained in it.

* I think, however, that the so-called ‘Mountain Trout’ of Kumáon, figured by Mr. McClelland in *J. A. S.* IV, 40, with its minute scales and other striking distinctions, is erroneously placed by him in this particular group in *As. Res.* XIX, II, 281, 367.

of the anal fin," as described by B. Hamilton; but all the fins are more or less minutely dotted, the dots tending to form a slight stripe along the lower half of several of the rays of the dorsal, anal, and ventral fins, the ventral and lower half of the caudal being more decidedly suffused with blackish.

D. 17.—*A.* 8.—*P.* 15.—*V.* 9.—*C.* 19.

The first rays of the dorsal and anal being minute, and the first three rays of each of these fins joined as usual. Tenasserim provinces.

DANGILA BERDMOREI, nobis, *n. s.* Readily distinguished by having a black spot at the tip of every scale. Head $4\frac{1}{2}$ times in the total length. Height about the same. Tentacles small and fine. Eye larger than in *D. CUVIERI* (figured by Valenciennes), and the back rising evenly from the muzzle to the base of the dorsal fin. About 40 scales on the lateral line, and 12 or 13 longitudinal rows.

D. 28.—*A.* 9.

Colour silvery, paler below, and each scale marked as described: the membrane of the dorsal fin minutely dotted, and all the fins slightly tinged with yellow. Length of only specimen $4\frac{1}{8}$ in.; the dorsal nearly $\frac{3}{4}$ in. high in front. Tenasserim provinces.

LEUCISCUS ANJANA, (B. H.): *L. lateralis*, McClelland. Tenasserim.

NURIA, Valenciennes. The members of this genus are *LEUCISCI*, with the dorsal fin placed far backward as in *PERILAMPUS*, but the anal is short as in *LEUCISCUS* proper, and there are four slender and rigid maxillary filaments, the upper sometimes of great length. To this genus belong *N. SUTIIA*, (B. H.), *JOJIA*, (ibid.), and (*Leuciscus*) *BARBATUS*, Jerdon.

N. ALTA, nobis, *n. s.* Of comparatively large size and deeper in the body than any previously described; but evidently nearly affined to *N. BARBATA*, (Jerdon), and like it with 32 scales along the body in 7 rows; each scale having three or four distinct diverging ridges. Upper filaments of great length, more than reaching to the anal fin; the other pair minute. Pectorals reaching to the ventrals.

D. 8.—*A.* 7.

Colour ruddy, with a broad yellow lateral band surmounted by a nearly obsolete black streak: gill-covers silvery; and a black spot above the base of the pectorals: fins pale and yellowish, more or less

tinged with dusky in the young. Length 4 in., by rather more than 1 in. in depth. Tenasserim.

N. ALBOLINEATA, nobis, *n. s.* Both broader and deeper in the body than *N. DANRICA*, (B. H.), with the muzzle scarcely upturned, and a longer anal fin—more immediately approximating the species to *PERILAMPUS* (as restricted). Upper filaments reaching to the tips of the pectorals, which latter do not reach to the base of the ventrals; the base of the dorsal is scarcely anterior to that of the anal; ventrals somewhat short.

D. 9.—A. 10.

Colour olive-green on the upper half, buffy-white below, with a broadish white stripe along the hind-half of the body chiefly, narrowing anteriorly, and more or less distinctly bordered by a blackish stripe above and another below, the lower more developed and becoming conspicuous towards the tail. A fuscous tinge on the pectoral fins; the other fins colourless, or perhaps yellowish. Length 2 in. or less. Tenasserim.

PERILAMPUS FULVESCENS, nobis, *n. s.* A species without cirri, and deep in the body, much resembling in form the *P. LOYOKULA*, (B. H., v. *P. psilopterus*, McClelland), but having longer and more pointed pectorals reaching nearly to the anal.

D. 10.—A. 22.

Colour (in spirit) dull fulvous, with a just perceptible narrow dark lateral streak, a little more decided towards the tail: infra-orbital plates and gill-covers bright silvery: irides yellow. Fins white, with a faint nigrescent wash, especially on the tail; the first ray of the ventrals much lengthened, as in certain affined species. Length $2\frac{1}{2}$ in. Tenasserim.

P. AFFINIS, nobis, *n. s.* Greatly resembles *P. LINEOLATUS*, nobis (*J. A. S. XXVII*, 289); but is a degree more typical, with the head distinctly upturned, and the anterior base of the dorsal is less forward, being more nearly parallel with that of the ventrals. It has also 13 dorsal and 16 anal rays, instead of 12 and 14. Markings obsolete on the anterior third of body, but the medial streak to base of tail very dark, bordered by a narrow pale streak above and by another below, and the dark one above this, again, broader than in *P. LINEOLATUS*. Length $2\frac{3}{4}$ in. Tenasserim.

PELECUS BACAILA, (B. H.) Tenasserim.

MOLA, nobis, *n. g.* A well marked group, which Dr. Jerdon referred to RHODEUS of Agassiz, founded on the *Cyprinus amarus*, auct. It is a form of LEUCISCUS, having very small scales; the mouth terminal and opening upward, with the lower jaw longer; no cirri; the eyes large, placed laterally near the muzzle. Form compressed, rather deep, the back considerably arched, with the dorsal medial or nearly so, and no osseous ray; dorsal and anal fins with few rays. The lateral line commences high, proceeding downward and then backward, and terminating abruptly about the middle of the body. No spots or other markings, beyond a broad silvery streak along the sides.

Type M. BUCHANANI, nobis; *Cyprinus mola*, B. H.

M. ATKINSONII, nobis, *n. s.* Very similar to M. BUCHANANI, but attains a larger size, and the scales are conspicuously larger in proportion, the lateral silvery streak being also much broader and less defined; no tinge of blackish on the fins. Scales about 56 by 20 (but difficult to count).

D. 8.—*A.* 7.—*P.* 15.—*V.* 9.—*C.* 19.

Length $4\frac{1}{2}$ in. by $1\frac{3}{8}$ in. deep. Tenasserim.

N. B.—The (*Rhodeus*) INDICUS and (*Rh.*) MACROCEPHALUS, Jerdon (*Madr. Journ. Lit. Sc.* XV, 324), appertain to this particular type; and the *Leuciscus microlepis*, Blkr. is probably identical with M. MACROCEPHALUS, (Jerdon). The (*Leuciscus*) HARENGULA and (*L.*) METELLINA of Valenciennes should also range in the same division, even if the lateral line be continuous, as represented in the figures of those species.

Fam. *Cobitidæ*. The Loaches. As suggested to me by Dr. Jerdon, the species of the old genus COBITIS constitute an extensive natural family, equivalent to *Cyprinidæ*, *Salmonidæ*, *Siluridæ*, &c., and need to be distributed into various genera.* In the *Histoire des Poissons*,

* Mr. Swainson recognises *Cobitidæ* as a distinct family; but then he regards the Carps, the Salmons, the Herrings, the Pikes and the Flying fishes, as 'subfamilies' only of *Salmonidæ*! Though why he distinguished *Esocinæ* from *Exocatinæ* does not appear, unless to complete his magic 'circle' of five; for he describes *ESOX* under *Exocatinæ*! In like manner, he tried (of course) to form a 'circle of five' of his *Cobitidæ*, but most unsatisfactorily, and with

M. Valenciennes recognises COBITIS only, with the addition of BALITORA, Gray, to which he refers the HOMALOPTERA of Kuhl and von Hasselt; but a Tenasserim species conforms in type to the H. ERYTHROPTERA, K. et v. H., and differs considerably from true BALITORA, as the latter differs entirely from the PLATYCARA of McClelland (as originally constituted upon his PL. NASUTA, which, as we have seen, is a large-scaled Cyprin). The ordinary Loches have been commonly arranged according to the presence or absence of a moveable forked spine under or before the eye; but Mr. McClelland divides them according to the shape of the tail into *Cobitis* and *Schistura*, each comprising both spined and spineless species. The series now to classify necessitates the adoption of further subdivisions and the admission of some entirely new forms.

I.—BOTIA, Gray; founded on B. GRANDIS, Gray, figured in Hardwicke's 'Illustrations of Indian Zoology;' to which have been rightly added the (*Cobitis*) GETA and (C.) DARIO of B. Hamilton. These have more the form of ordinary Cyprins, and a strongly forked tail: the air-vessel as usual in the Carp family. We have now five species in the museum, comprising two hitherto undescribed which nearly approximate B. GRANDIS, but have the muzzle less prolonged—so that the distance from the eye to the muzzle is a fourth less. All have a stout forked spine under each eye, of which the second or posterior prong is much longer than the anterior; and their colours are bright black and yellow, with barred markings on the fins.

1. B. GRANDIS, Gray (*nec apud* McClelland, *C. J. N. II.* II, 586). Of this we possess a blanched specimen from Almorch, presented by the late Major R. Wroughton.

2. B. NEBULOSA, nobis, *n. s.* Like B. GRANDIS, but with the face shorter (as described), and eight cirri not quite so strongly

unnecessary coinage of new names. Thus BOTIA of Gray he terms *Diacantha*, retaining two of B. Hamilton's species which he refers to, *viz.* DARIO and GETA. His *Diacantha* is moreover erroneously stated to have "the body destitute of scales;" which again is erroneously asserted of his *Canthophrys*, to which he refers the C. GUNTEA, B. II., by the new name *vittatus*. I doubt if any Loche is scaleless. The 'circle of five' completed, of course a redistribution is necessary as often as any well-marked new form is brought to notice, and especially such very strongly characterised generic forms as will be here described.

developed. Body imperfectly banded, shewing about seven irregular transverse bands, which are double or dark only on their borders and more or less broken and confluent. Three distinct lines of spots on the dorsal, besides its dusky tip: three also on the forked caudal, besides the base and tip: five in all on the pectorals; two on the ventrals; and two (indistinct) on the anal. Colours black and gold in the recent specimen, as in the various affined species; the markings tending to assume the spotted appearance proper to *B. GRANDIS*. The fin-rays are alike in both.

D. 10.—*A.* 6.—*P.* 13 or 14.—*V.* 8.—*C.* 19.

Length of specimen $5\frac{1}{4}$ in. Height of body 1 in.; at base of tail nearly $\frac{5}{8}$ in. From Dorjiling: presented by the late Dr. Wallich.

3. *B. HISTRIONICA*, nobis, *n. s.* A species of very remarkable beauty, similar to the last in form but having the eight cirri still less developed. Only five black bands on the body, the first of which encloses the gill-covers and the third descends from base of dorsal: another crosses the forehead and eyes: another, again, passes from before each eye to the cleft of the mouth; and the medial portion of the face is also black to the muzzle. The bands of the body are broad and subregular in shape, each containing a pale round spot at the lateral line and another on the ridge of the back. Dorsal fin with one broad interrupted black band, and some black also at base. Pectorals, ventrals, and anal, each with two black bands; and the caudal also with two broad bands and a black tip to each lobe. Fin-rays as in the two preceding species; and the markings exhibit a sort of link between those of *B. NEBULOSA* and of *B. GETA* and *B. DARIO*. Length $4\frac{1}{2}$ in. Tenasserim.

II.—*SYNCROSSUS*, nobis, *n. g.* Like *BOTIA*, but more compressed, with similar forked tail; the head much compressed, small, elongated, and tapering to the muzzle, which terminates in one flat filament that ramifies into four; two cirri only on the lower jaw: eyes placed high, but laterally; and nostrils midway between the eyes and muzzle. A forked spine anterior to the eye, of which the second prong is more developed.

1. *S. BERDMOREI*, nobis, *n. s.* (Probably *Schistura grandis* apud McClelland, from the Khásya mountains, *C. J. N. II.* II, 586.) Length $5\frac{1}{2}$ in., by $1\frac{1}{16}$ in. deep at dorsal fin. Eight distinct lateral

black bands, the second of which proceeds from the anterior base of the dorsal fin; as seen from above, there are three more anterior bands, and an imperfect fourth at the occiput; these on the sides are broken into numerous spots, seen also on the gill-covers, and more or less on the sides of the face. Two longitudinal dark bands on the occiput unite into one towards the muzzle. Dorsal fin with three series of black spots, more or less well defined as distinct rows, and sometimes one large black spot towards the end of the first three rays. Tail with four or five transverse rows of distinct spots, continuous as a series of bands in some specimens. Pectoral, ventral, and anal fins spotless. A dark streak from eye to muzzle.

D. 11.—*A.* 6.—*P.* 13.—*V.* 8.—*C.* 17.

Length $5\frac{1}{2}$ in., of which head to gill-cover is $1\frac{5}{16}$ in. Tenasscrim provinces.

N. B.—The *Schistura grandis* apud McClelland, from the Khásya hills, belongs clearly to this genus, though perhaps to a second species. "The head is long, much compressed, with two strong prickles beneath each eye; mouth narrow; four short cirri suspended from a single pedicle on the snout; and two from a single pedicle at the apex of the lower jaw, and one at each corner of the mouth.

D. 10.—*A.* 1-7 [?].—*P.* 14.—*V.* 9.—*C.* 19.

"Body and fins covered with irregular green spots and streaks
Habitat Káshyá mountains."

III.—*PROSTHEACANTHUS*, nobis, *n. g.* Form greatly elongate, subcylindrical; the head much lengthened, compressed, tapering, with the eyes small, placed very high and near together, but laterally directed; moveable forked spine situate midway between the eye and muzzle, its posterior prong longer. Two minute cirri above, and below a broad lappet which tends to divide into four rudimentary cirri. Dorsal fin equidistant from the muzzle and tail-tip, its base anterior to that of the ventrals. Tail moderately furcate.

PR. SPECTABILIS, nobis, *n. s.* From twelve to fifteen transverse black bands on the back, and as many large black spots along the lateral line; between them an irregular longitudinal series of small spots: a row of four or five spots along the profile, and a row of smaller spots on the cheeks. One row of small spots on the rays of the dorsal fin, a large black spot towards the end of its first ray, and a terminal

series more or less distinct. Tail with one large spot towards the end of each lobe, and two or three more intermediate; also an irregular row of spots towards its base. Pectoral, ventral, and anal fins, colourless or nearly so.

D. 10.—*A.* 6.—*P.* 11.—*V.* 6.—*C.* 17.

A very prettily marked fish. Length 5 in., of which head to gill-cover 1 in.; and height at dorsal $\frac{1}{2}$ in. Tenasserim provinces.

IV.—*ACANTHOPIS*, Agassiz. The ordinary spined Loches with compressed head, of which the European *A. TENIA* is typical.

Of these, some are of more elongate shape, with the dorsal fin placed somewhat backward and distinctly posterior to the ventrals; tail rounded more or less; and the head not so much compressed as in the others, with the eyes placed high, but not approximated as in *PROSTHEACANTHUS*. Such are *AC. TENIA*, (L.), and the Indian *AC. GONGOTA* and *AC. CURCURA*, (B. H.) Also

AC. BERDMOREI, nobis, *n. s.* Of a pale reddish clay-colour, thickly freckled over with blackish except on the abdominal region; about a dozen larger black spots along the lateral line, more or less distinct; the dorsal aspect uniformly dark or nearly so: head minutely speckled: bifurcate spine small, with subequal prongs: well developed cirri: dorsal and caudal minutely speckled throughout; the anal less so; and pectorals and ventrals dark-centred.

D. 8.—*A.* 6.—*P.* 8.—*V.* 6.—*C.* 17.

Length $3\frac{1}{2}$ in., of which head $\frac{5}{8}$ in.: depth of body $\frac{1}{2}$ in. Tenasserim provinces.

Others have a shorter body, with the dorsal in the middle of the entire length and opposite to the ventrals; the head small and much compressed. To this division appertains *AC. GUNTEA*, (B. H.), which is the only species of Loche common about Calcutta.

AC. MICROPOGON, nobis, *n. s.* Head and body very much compressed, the tail furcate, and cirri minute: posterior prong of the bifurcate spine conspicuously longer and stronger. Body pale, blotched and mottled with light ashy-brown, and showing a more or less obscure series of ten transversely oval ashy spots along the lateral line, and a black one at base of tail: each tail-lobe marked with four oblique dark cross-bands, the last of them terminal: four transverse

dusky striæ on the dorsal, not well defined; the lower fins with one or more obscure dark striæ, or merely a little powdered with dusky.

D. 8.—*A.* 6.—*P.* 7.—*V.* 7.—*C.* 16.

Length $2\frac{1}{2}$ in., by $\frac{3}{8}$ in. deep at base of dorsal, and $\frac{1}{8}$ in. across base of ventrals, the back much narrower. Tenasserim provinces.

Other forms of spined Loches will have to be discriminated; amongst which, one very distinct may be termed—

V.—*PANGIO*, nobis, *n. g.* Of uniform thickness, elongated, slender, with the dorsal fin placed very far backward, much nearer to the tail than to the head; the head short, much compressed between the eyes, and each nostril furnished with a short filament, additional to the six labial cirri. Anterior prong of the infra-ocular spine distinctly longer.

P. CINNAMOMEA: *Cobitis pangio*, B. H.; *C. cinnamomea*, McClelland. This has small fins and a round tail; but certain Indonesian species affined to it have a forked tail. The ventrals are well developed.

VI.—*APUA*, nobis, *n. g.* Much like the last, but the dorsal placed still further backward, and the ventrals *wanting altogether*. The head, and the fins, smaller than in *PANGIO*; the former still more compressed, and the same infra-ocular forked spine, and eight cirri (two of which are given off from the nareal apertures), but the cirri are more minute. The spines are exceedingly liable to be overlooked. Dorsal placed at the commencement of the last fourth of the entire length; the anal near the tail: all the fins being small and narrow.

A. RUSCA, nobis, *n. s.* Of three specimens of this curious fish, the largest measures $2\frac{1}{2}$ in. long, by $\frac{1}{4}$ in. deep, and $\frac{1}{8}$ in. broad; head $\frac{5}{16}$ in.: from muzzle to base of dorsal $1\frac{3}{4}$ in. The rays of the dorsal, anal, and pectoral fins are difficult to distinguish, but appear to be

D. 7 or 8.—*A.* 6.—*P.* 9.—*C.* 17.

On a cursory view, the dorsal, anal, and pectoral fins might be supposed each to contain two or three rays only, these fins being remarkably narrow. Colour uniform dull brown, paler below. Tenasserim.

Had it not been for the total absence of the ventral fins, this form

might have been included in PANGIO; and very closely akin to it, again, must be the COBITIS MICROPUS, Val., from China, in which the ventral fins are minute,*—but this would appear to have no infra-ocular spine. M. Valenciennes, however, remarks of it—"La caudale, arrondie, a deux carènes charnues sur le dos ou sur la base de la queue, qui semble augmenter la longueur de la nageoire ou simuler une sorte d'adipose." This exactly describes what is seen in our largest specimen of APUA FUSCA; but in the others the ridge is continuous. C. MICROPUS should constitute another generic *coup*; and another again occurs in the MISGURNA, Lacépède, founded on the European (C.) FOSSILIS.† This last is akin to the first division of ACANTHOPTIS, but is still more elongated, subcylindrical, or only a little compressed laterally, and it has no infra-orbital spine, but an indication of the facial slit that conceals the spine in all the preceding. It has therefore been held to conduct to the spineless Loches, to which, for the present, I restrict—

VII.—COBITIS, L. Type C. BARBATULA of Europe. These never have the head so much compressed as in the majority of Spined Loches, and in some it is even broader than the body: the latter also tends in many of them to be subcylindrical rather than compressed. Some, however, are moderately compressed, approaching to the form of BOTIA, but more elongated; having also a large dorsal fin of many rays: such is—

C. RUBIDIPINNIS, nobis, n. s. A fine species, $4\frac{3}{4}$ in. long, by $\frac{2}{5}$ in. deep, and $\frac{1}{2}$ in. broad; fully $\frac{1}{4}$ in. between the eyes; from eye to muzzle $\frac{3}{8}$ in.; and head from gill-cover $\frac{2}{5}$ in.; the dorsal fin nearly 1 in. along its base. Six well developed cirri; and a peculiar character consists in a short broad obtuse spine-like process projecting from the middle of the upper lip: tail somewhat rounded. General colour olive-brown with a ruddy wash, paler below; the fins tinged with red; dorsal and caudal fins transversely rayed with dusky, the other fins without markings. On the dorsal are four or five rows of dark

* He terms it "la Loche aux petites ventrales."

† Another, again, perhaps, in certain rather elongated Loches of China, which have ten cirri; as the C. BIFURCATA and C. PECTORALIS, McClelland, and C. ANGUILLICAUDATA, Cantor, figured by Sir J. Richardson in the *Zoology of the Voyage of the Sulphur*.

spots, on the caudal ten or more transverse lines. Pectoral fins much larger than the ventrals. The rays are—

D. 15.—*A.* 6.—*P.* 10.—*V.* 7.—*C.* 17.

Tenasserim provinces.

Others have the body proportionally less deep; as the *C. BILTARIA*, *B. H.* ;* nearly affined to which ranks—

C. SEMIZONATA, nobis, *n. s.* Four well developed cirri above and two below: a minute spinelet above the muzzle (as in *C. MONOCERA*, McClelland):† tail slightly bilobate: pectorals larger than the ventrals: the dorsal consisting of sixteen rays and the anal of six. A series of twelve to fourteen dark transverse dorsal bands, occasionally forked or confluent, attenuating and curving backward as they descend till they reach the lateral line, below which is a longitudinal row of about twelve irregular blackish spots: head spotted with blackish, the spots sometimes uniting to form transverse bands on the occiput: a black spot surrounded with white at base of tail above: lower parts pale and spotless. Dorsal fin with four or five irregular rows of dark spots: caudal with seven or eight dark transverse lines. Length $3\frac{1}{2}$ in., by more than $\frac{1}{2}$ in. deep at base of dorsal, and above $\frac{1}{4}$ in. broad. Tenasserim provinces.

The great mass of small spineless Loches have the head shorter anterior to the eyes, the dorsal fin with fewer rays (commonly nine or ten, or not so many), and the tail slightly furcate. The pectorals

* To *C. BILTARIA* I refer a specimen from Másuri, having 12 rays only to the dorsal and 7 to the anal fins; the black spots on the dorsal and black transverse lines to the caudal being well defined. Length $2\frac{3}{4}$ in. It agrees with a specimen from the Brahmaputra, excepting that the tail-markings are finer and more distinct.

Another species from Másuri, which agrees in all else with Mr. McClelland's description of *C. MONTANA*, is in every respect a typical *COBITIS*, but has *not* "a single sub-orbital spine on each side." The zones or bands on the body vary in number and breadth and in arrangement in different specimens, and the dorsal and caudal fins are more or less speckled, in some much more so than in McClelland's figure. Largest specimen $3\frac{1}{2}$ in.

These Másuri specimens are in the private collection of Major R. C. Tytler.

† This little nasal process re-appears in *HOMOLOPTERA BILINEATA*, nobis, described in the sequel.

and ventrals are mostly nearly equal in size. This form is exemplified by those figured by Mr. McClelland in *As. Res.* XIX, II, pl. 53, figs. 1, 3, 4, 5, and 6, and also by the two Kashmirian species figured by Heckel. To it appertain—

C. ZONALTERNANS, nobis, *n. s.* Largest specimen $1\frac{5}{8}$ in. long, with ten dorsal and six anal rays. It has a dark lateral streak, crossed by twelve short transverse bands, which alternate with about the same number of dorsal dark cross-bands. The dorsal fin is marked with three and the caudal with four rows of black spots: the other fins being spotless. Tenasserim provinces.

C. CINCTICAUDA, nobis, *n. s.* Very like *C. SCATURIGINEA*, B. H., but with fewer rays to the dorsal and anal (*viz.* seven and six respectively), and the body more regularly banded; shewing about ten dorsal transverse bands which are broader than the alternating yellowish bands, and a strongly marked black transverse bar at base of tail,—also a dark bar between the eyes and mouth, crossing the muzzle. Two black spots on base of dorsal, and above them a black speck on each ray; the other fins without markings. Length 2 in. Tenasserim Provinces.

VIII.—*HOMOLOPHERA*, Kuhl and von H. asselt. A form intermediate to the ordinary spineless *Loches* and *BALITORA* of Gray.

H. BILINEATA, nobis, *n. s.* Affined to *H. ERYTHRORHINA*, (figured as *Balitora erythrorhina* by M. Valenciennes,) but with the *BALITORA* tendencies less decided. A minute blunt knob on the muzzle, as in certain species of restricted *COBITIS*. Nine dorsal and six anal rays; the tail acutely furcate. A narrow dark line from muzzle to eye, continued behind the eye as a broad, irregular, and somewhat zigzag band, set off laterally with whitish, and joining its opposite behind the dorsal fin: a corresponding but obscure band below the lateral line, little seen on the hind-half of the body. Dorsal with a large blotch of black and one small posterior spot. Caudal fin also black, with the sides of its base and the forking tips white (or yellow?), but the extreme tips black. Pectorals, ventrals, and anal, blotched with black: sides of body somewhat nigrescent. Largest specimen $2\frac{3}{4}$ in. long. Tenasserim provinces.

Fam. *Clupeadæ*.

CHATESSUS MANMINA; *Clupanodon manmina*, B. H. Tenasserim provinces.

Fam. *Anguillidæ*.

ANGUILLA ARRACANA, McClelland. Young, 7 in. long. Tenasserim.

Fam. *Symbranchidæ*.

AMPHIPNOS CUCHIA, (B. H.). Tenasserim. Mr. Theobald.

Fam. *Hippocampidæ*.

HIPPOCAMPUS MANNULUS, Cantor. Tenasserim, Mr. O'Reilly. Also Port Blair.

Fam. *Tetrodontidæ*.

LEIOSOMUS CUTCUTIA; *Tetraodon cutcutia*, B. H.: *L. marmoratus*, Swainson. Procured at Maulmein by Mr. Theobald, *J. A. S.* XXIV, 712. Type of *Monotreton*, Bibron.

GASTROPHYSUS LUNARIS; *T. lunaris*, Cuv.: *T. tepe*, B. H.; *T. leiopleura*, Gray, et *T. spadiceus*, Richardson, apud Bleeker. Tenasserim.

AROTHRON SIMULANS, Cantor: *T. fluviatilis* apud nos, *J. A. S.* XXIV, 712. Procured at Maulmein by Mr. Theobald.

CHONERHINOS NARITUS (?); *T. naritus* (?), Richardson. Some small specimens, procured at Amherst by E. O'Reilly, Esq., accord with Dr. Cantor's description (*J. A. S.* XVIII, 1365), except in having no dark markings on the dorsal, anal and caudal fins. Perhaps, therefore, an affined species rather than the same.

Five species of this family are commonly procurable in the Calcutta fish-bazars; but I have never been able to obtain the *T. FLUVIATILIS*, B. H., which is a *GASTROPHYSUS* of J. Müller.* One approximating it in appearance, like the *A. SIMULANS*, may be designated.

AROTHRON DORSOVITTATUS, nobis, *n. s.* Attains to 8 in. long. The spines much larger and more sparsely inserted than usual; a series of about twelve only occurring on the dorsal region, from one pectoral fin to the other. Caudal region, from some distance anterior to the dorsal and anal fins, quite free from spines. Head exceeding one-fourth of the total length. Lateral line indistinct.

* Type of *Dichotomycteris*, Bibron, *Rev. et Mag. de Zool.* 1855, p. 279, which I have not now to refer to.

D. 15.—A. 13.—P. 21.—C. 12.

Colour dusky yellowish-green, with usually three distinct pale bands crossing the dorsal aspect, anterior to the dorsal fin; the first passes from eye to eye, terminating near the hind-part of the orbits; the second passes in a curve from before the pectorals, and is sometimes double; and the third occasionally reaches back as far as the dorsal fin, but is generally a little in advance of it; the interspaces of those pale bands being infuscated and undivided, but posterior to the third of them the alternating dusky bands are broken into roundish spots of various sizes, much as in *GASTROPHYSUS FLUVIATILIS* (as figured by Buchanan Hamilton), only the spots run generally smaller; but there are no bars on the caudal fin, though occasionally it is much infuscated, together with the entire lower-parts. A common species.

GASTROPHYSUS MICROPTHALMOS, nobis, *n. s.* Still commoner than the last, but hitherto overlooked from its general resemblance to *G. PATOCA*, (B. H.) It has, however, a conspicuously smaller eye, a considerable development of spinelets both anterior and posterior to the pectorals (whereas *G. PATOCA* has generally the sides quite smooth, or at most and rarely a very few spinelets at that part), and the nareal apertures have no distinct appendage (whereas in *G. PATOCA* they have a considerable membranous appendage both before and behind, approximating this particular species to *AREOTHRON*). Again, the pale spots of the upper-parts are generally smaller and more numerous, also more angular, and they mostly form a series of transverse stripes on the sides. Head exceeding two-fifths of the total length: the fimbriation of the lips internally much developed. Dorsal and anal fins rather falcate; the caudal square.

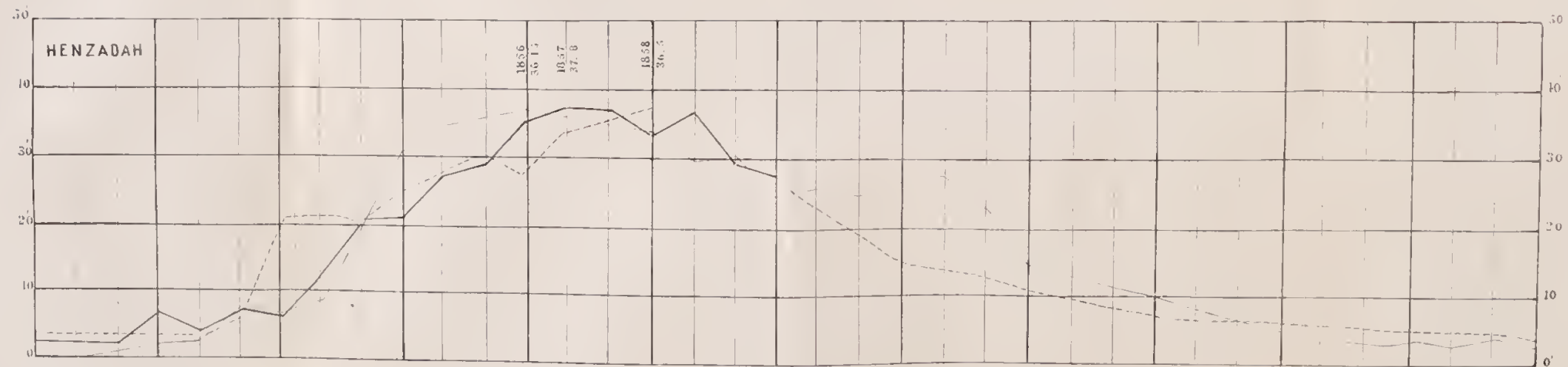
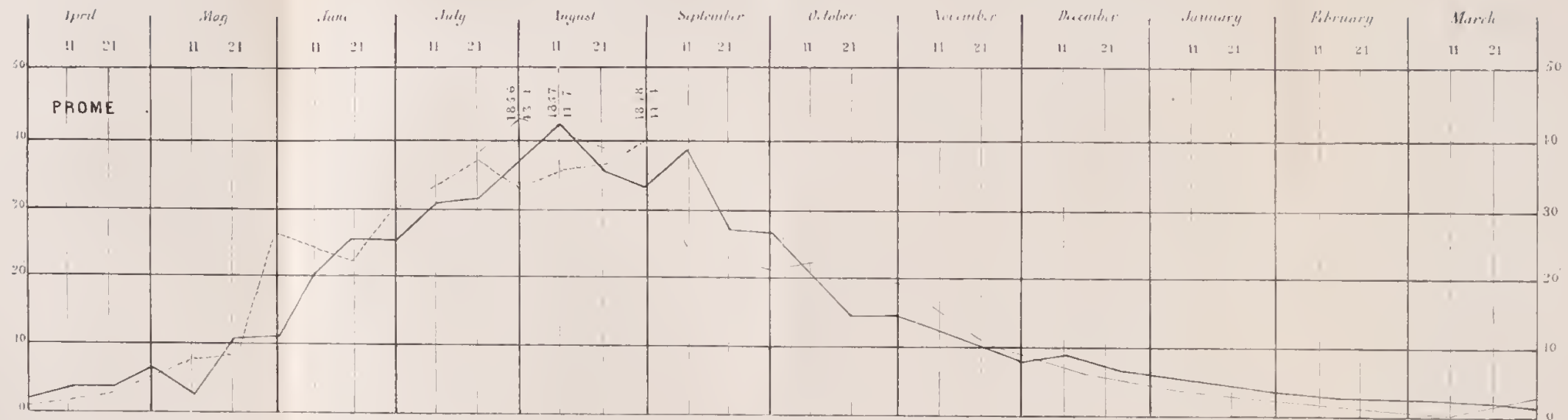
D. 13.—A. 11 or 12.—P. 16.—C. 12.

Colour dark olive-green on the upper-parts, studded with numerous greenish-silvery spots and transverse stripes, the latter prevailing on the sides: medial third of body spotless golden; the belly white; and the fins more or less tinged with bright yellow. Irides orange. Equally common with *G. PATOCA*, and attains to as large a size, or to about 18 in. in length.

Our three other species, obtainable in the Calcutta fish-bazars, are *LEIOSOMUS CUTCUTIA*, *GASTROPHYSUS LUNARIS*, and *G. PATOCA*, (B. H.)

DIAGRAMS showing the RISE and FALL of the IRAWADI RIVER at PROME and HENZADAH.

during the Years 1856, 1857, 1858.



TRANS. A. S. M. S. I. R. A. W. A. D. I. R. I. V. E. R. A. C. A. V. E. R. S. E. D. A. T. I. O. N. S.

A. A. Cunningham Lt. Col.
Chief Engineer
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Memorandum on the Irawadi River, with a monthly Register of its Rise and Fall from 1856 to 1858, and a measurement of its minimum discharge.—By Lieut.-Col. A. CUNNINGHAM.

Under instructions from Major Phayre, Commissioner of Pegu, a daily register of the rise and fall of the river Irawadi has been kept at Thayetmyo, Prome and Henzadah, from the highest flood in 1856 to the maximum rise in 1858. The results of these observations at Prome and Henzadah are embodied in the accompanying diagrams, which show the actual height of the river at each place on every tenth *day* throughout the period of observation. The Thayetmyo register has been omitted, because the first twelve months' observations are palpably erroneous, and cannot now be corrected, whilst the last twelve month's observations correspond so closely with those taken at Prome, that I did not think it worth while to draw up another diagram for a single year.

2. The Irawadi generally attains its lowest level about the end of March, when a slight rise takes place for a week or ten days until the middle of April, after which time for about a month, the river becomes stationary, occasionally rising and falling until the first week of May. This is the usual period for the setting in of the monsoon, and the river continues steadily to rise, with but few checks until August, when it attains its maximum. The actual period at which the river has gained its greatest height during the last three years has ranged from the end of July to the beginning of September. The following are the dates of maximum at the three places of observation :

+	THAYETMYO.	PROME.	HENZADAH.
1856	29th July.	30th July.	30th July.
1857	10th August.	10th August.	11th August.
1858	4th September.	5th September.	1st September.

3. The following are the dates of minimum, or lowest level :

—	THAYETMYO.	PROME.	HENZADAH.
1856	—	—	14th April.
1857	7th April.	10th March.	8th March.
1858	20th March.	31st March.	3rd May.

4. I have no means of comparing the monthly rise of the river with the monthly fall of rain, as the only rain registers which I have been able to procure are those of Rangoon. The diagrams, however, show that an early setting in of the monsoon is accompanied by an early rising of the river. For instance, there was no rain in April 1857, when the first great rise of the river was delayed until the 20th June. During the present year, however, there was a fall of more than six inches of rain during April, and accordingly the Irawadi attained its first great rise on the 1st of June or just three weeks earlier than in the previous year.

5. The diagrams also show, by the exact correspondence in time, as well as by the relative correspondence in quantity, of the alternate risings and fallings both at Prome and at Henzadah, that the annual swell of the river is mainly due to the rain-fall in its upper course. Thus, the pulsations of the river at Henzadah generally take place just one day later than at Prome. This coincidence in the times and quantities of the swell and fall of the river above the Delta might have been inferred from the narrowness of the strip of land drained by the lower Irawadi compared with the greater breadth drained in its upper course.

6. These diagrams further show the very small amount of rise that is due to melted snow, and consequently the limited extent of the snowy mountain range drained by the Irawadi. As this is a point of some interest with reference to the still disputed question of the connection of the Irawadi with the Tsânpû River of Tibet, I now give the details of the rise and fall of the Irawadi for every ten days between the date of lowest level, and that of the first great rise due to the setting in of the Monsoon.

PROME.

1857.		TOTAL.	1856.		TOTAL.
10th March,	— 0·0	— 0·00			
21st „	+ 1·6	+ 1·60			
1st April,	— 1·4	+ 0·20	31st March.	— 0·0	
11th „	+ 0·75	+ 0·95	11th April.	+ 0·7	+ 0·7
21st „	— 0·55	+ 0·40	21st „	+ 0·6	+ 1·3
1st May,	+ 4·10	+ 4·50	1st May.	+ 3·1	+ 4·4
11th „	— 4·20	+ 0·30	11th „	+ 1·8	+ 6·2
21st „	+ 8·65	+ 9·95	21st „	+ 0·9	+ 7·1

HENZADAH.

1857.		TOTAL.	1858.		
11th March,	— 0·00	0·00			
21st „	+ 1·65	+ 1·65			
1st April,	— 0·65	+ 1·00			
11th „	— 0·20	+ 0·80			
21st „	— 0·10	+ 0·70			
1st May,	+ 4·10	+ 4·80			
11th „	— 2·60	+ 2·20			
21st „	+ 4·90	+ 7·10			
1st June,	— 0·10	+ 7·00			

7. In all these registers, it will be observed that there is a sudden rise of about four feet during the last ten days of April. As this rise is succeeded by a sudden decrease, I would attribute the swell of the river solely to the fall of these heavy bursts of rain which usually precede the steady falls of the Monsoon rain. The small amount of rise that takes place before the setting in of the Monsoon is further proved by the state of the Panlang Creek, which, with a minimum depth of 2 feet of water, is never open for steamers drawing four feet until the monsoon has fairly set in.

8. The abstract of the registers kept at Prome and Henzadah is given in the following tables :

Monthly Rise and Fall of the Irawadi River, during the years 1856, 1857 and 1858, in Feet and Decimals.

	PROME.						HENZADAH.					
	1856.		1857.		1858.		1856.		1857.		1858.	
	—	+	—	+	—	+	—	+	—	+	—	+
January ...			2.3		2.2				5.0		1.0	
February ...			1.4		0.8				1.9		1.0	
March ...			0.6	0.2					0.9	1.0	1.0	
April ...				4.3		4.4		2.3		3.8	1.0	
May ...				4.8		21.0		4.1		2.2	0.3	18.3
June ...				14.0		3.1		24.7		11.9		3.7
July ...	0.5			13.5		3.5		5.3		14.8		3.5
August ...	7.1		8.4	4.9		8.0	3.7		3.8	2.1		3.4
September ...	14.7		6.5			0.2	8.2		6.6			
October ...	1.5		12.2					1.5	12.0			
November ...	11.2		6.9				11.9		4.0			
December ...	3.8		2.5				0.9		4.0			

Annual Rise above the lowest known level.

	THYETMYO.	PROME.	HENZADAH.
1856	—	43.1	36.4
1857	45.6	41.7	37.8
1858	45.5	41.4	36.5
Average rise	45.55	42.06	36.90

9. The volume of water discharged by the Irawadi in the dry season is another subject of considerable importance towards clearing up the still disputed question of the sources of the river. The great French geographer D'Anville first broached the opinion that the upper course of the Irawadi was the Tsânpû River of Tibet, but the great English geographer Major Rinnell of the Bengal Engineers identified the Tsânpû with the upper course of the Brahmaputra River. The former opinion was adopted by Klaproth, Dalrymple, and Griffith. The latter opinion by Wilcox, whose adventurous journey across the Khamti mountains to the upper valley of the Irawadi has all but finally established that the sources of the Irawadi could not be far to the north of latitude $27^{\circ} 26'$, the point where he

struck the river. The fact that the Irawadi was then only 8·0 yards broad and fordable, is absolutely conclusive regarding the small volume of its water, and should I think be equally so regarding the near vicinity of its source.

10. The minimum discharge of the Irawadi is differently stated by the only two observers who have yet published their measurements. On 25th April, 1853, Dr. McClelland found the breadth of the river at Prome to be 3,630 feet with a mean depth of 12·7083 feet, giving a sectional area of 46,131·129 square feet. The velocity of the current was $1\frac{21}{2}$ miles per hour, or 2·8666 feet per second. Dr. McClelland calls this the "mean speed." This measurement refers to the surface velocity and not to the average velocity of the mass, to obtain which he multiplies the above mean speed by 0·8, and makes the discharge 105,794 cubic feet per second. But the formula for obtaining the average velocity of the mass which is given by Cape, and by Jackson, the Secretary of the Royal Geographical Society, as determined from the experiments of Du Buat, yields a very different result. By this formula the velocity of the mass, $M = \frac{(\sqrt{S}-1)^2 + S}{2} = S - \sqrt{S} + \cdot 5$, where S = the surface velocity of the stream. By using this formula, the mean velocity of the mass of water is reduced to 1·67352 foot per second, which yields a discharge of 77,201·151 feet per second. But as the river fell fifteen inches after the date of Dr. McClelland's measurement, this amount has to be brought still lower by deducting 1·25 foot from the mean depth of 12·7083 feet. This will cause a reduction of 7592·760 cubic feet, and thus make the minimum discharge of the Irawadi in 1853 at Prome 69,608·391 cubic feet.

11. The other measurement of the Irawadi was taken by Mr. T. Login, at the head of the Delta, just above the point where the Bassein river branches off. The measurements were made I believe in 1855, but the details have not been published. The result alone is given, which makes the minimum discharge at the head of the Delta at 75,000 cubic feet.

12. On the 30th March, 1857, a third measurement of the Irawadi was made at Meaday at my request, by Lieut. G. de P. Falconnet of the Madras Engineers. This measurement was conducted with

great care ; the mean depth of the stream having been determined in thirteen different places, and the whole operations repeated five distinct times. The breadth of the stream was 2,057 feet. The mean depth was 21·2423 feet, and the extreme depth 29 feet, with a surface velocity of 3 feet per second, or 2·04545 miles per hour. From these data the sectional area was 43,695·411 square feet, and the mean velocity of the mass of water, calculated by the formula before quoted, was 1·7679 cubic feet per second. The discharge on the 30th March, 1857, was therefore 77,249·097 cubic feet. But as the river, according to the flood register kept at Thayetmyo, fell exactly 1 foot after this date, a corresponding decrease must be made by deducting 1 foot from the mean depth. This will cause a reduction of 3,636·570 cubic feet and thus make the minimum discharge of the Irawadi in 1857 at Meaday 73,612·437 cubic feet.

13. The results of these measurements, although made by three different persons, at three different places, and in three different years, correspond so well together, that I think we may place considerable reliance upon their accuracy. I repeat them for comparison.

Minimum discharge at Meaday in 1857	73,612·437	cubic feet.
„ at Prome in 1853	69,608·391	„
„ at Head of Delta in 1855	75,000·000	

The difference between the extremes is only 5,400 cubic feet, an amount which is within the limits of variation of the low water level of the river, between a very dry season, and an average one. The mean of the two observations at Meaday and Prome is 71,610 cubic feet, which I think may be taken as a very close approximation of the usual minimum discharge of the Irawadi river at those places. The discharge at the head of the Delta above Henzadah, as determined by Mr. Login at 75,000 cubic feet, corresponds so closely with these observations, that I have every confidence in its accuracy.

14. To bring these measurements of the discharge of the lower Irawadi to bear upon the question of its sources, we must compare the volume of water discharged at certain points with its area of derivation, or extent of surface drained. This question has been ably discussed by Captain Yule in his note on the sources of the Irawadi, published in his narrative of Major Phayre's mission to Ava. In this note all available information on the subject is detailed and

compared, and Captain Yule gives his decision in favour of the lower estimate of Mr. Logan. The following statements of "the areas drained by the Irawadi in different parts of its course, assuming its sources in the Khamti mountains" are taken from Captain Yule's note:

Below Magoung River	5 $\frac{3}{4}$	square degrees.
At Amarapura	13 $\frac{1}{2}$	"
At Prome	31	"
Head of Delta	32 $\frac{1}{2}$	"

To these I may add Moong Khamti in lat. 27° 26' where Wilcox found the Irawadi only 80 yards broad and fordable. Assuming the sources in the Khamti mountains as before, the area of drainage will be only three quarters of a degree, or certainly less than one degree.

15. Now taking the discharge at the head of the Delta at 75,000 cubic feet, and the area of derivation at 32 $\frac{1}{2}$ degrees, the volume of water will be 2,300 cubic feet per square degree of country drained. The discharge at each of the above points will therefore be as follows:

Moongkhamti	1,733	cubic feet.
Below Magoung River	13,175	"
At Amarapura	31,050	"
At Prome	71,300	"

As the *calculated* discharge at Prome is within two hundred cubic feet of the mean discharge obtained by the actual measurements of Dr. McClelland and Lieut. Falconnet, the calculated amounts of discharge at the other points may be assumed as fair approximations to the truth.

16. The calculated discharge of the Irawadi at Moong Khamti must now be compared with the state of the river as described by Wilcox. He found the river 210 feet broad and fordable: that is, the greatest depth was not more than 3 feet, and the mean depth about 2 feet. The sectional area would therefore be 480 feet, which, compared with the above calculated discharge of 1,733 cubic feet, would give the mean velocity of the mass of water at 3.61 feet per second; which is equivalent to a surface velocity of 6.125 feet per second, or somewhat more than 4 miles per hour.

17. If the area of derivation be taken at one whole degree, the discharge at Moong Khamti will be 2,300 cubic feet, or one-third

more, and the surface velocity will be increased to upwards of $5\frac{1}{2}$ miles per hour. Even admitting that the mean depth may have been three feet, the discharge would still be under 3,000 cubic feet. But as a stream with a mean depth of three feet, and a current of $5\frac{1}{2}$ miles per hour, would be almost, if not quite, unfordable, a volume of 3,000 cubic feet may be considered as the extreme discharge of the Irawadi at Moong Khamti, consistent with Wilcox's observations.

18. If this determination is correct, and I do not see how its accuracy can be disputed, what has become of the Tsânpû, the great river of Tibet? The following measurements of the Brahmaputra and its tributaries will probably assist in determining this point :

On 26th December, 1825.

On 29th March, 1826.

Dihong (Bedford).....	56,564 cubic feet.	
Dibong ,, 	13,100 ,,	
	<hr/>	
Joint stream ...	69,664	86,211
Brahmaputra (Wilcox)		
at Saduja	19,058	33,965
	<hr/>	<hr/>
Total discharge ...	88,722	120,176
	<hr/>	<hr/>

On comparing the discharge of the Dihong with that of the Dibong and Brahmaputra, the only natural way of accounting for its immensely superior volume is by supposing that it must be fed by some large stream from beyond the Himalaya. No accounts of Cis-Himalayan drainage calculated from the data supplied by the measurements of the Brahmaputra and Dibong would give a greater discharge than 20,000 or at most 25,000 cubic feet. The question then arises whence comes the other large volume of 30,000 cubic feet of water, to which the *only* obvious reply is "from the Tsânpû River of Tibet beyond the chain of the Himalaya." The lower course of the Tsânpû, where it breaks through the mountains, is unknown; but from all the evidence collected by Wilcox, compared with the small discharge of the Irawadi, and with the large volume of the Dihong, the connection of the Tsânpû and Dihong Rivers seem to me to be as clearly and satisfactorily established as any deduction can possibly be without absolute ocular demonstration.

19. The last link of corroborative evidence in favour of the Trans-Himalayan source of the Dihong is the greater coldness of its waters compared with those of the Ganges and other rivers, for the knowledge of which fact I am indebted to Colonel Phayre. I conclude that the greater frigidity of the Dihong is due to the large volume of melted snow supplied by the Tsânpû, which imparts some portion of its original coldness to the waters of the Dihong.

Attempts of Asiatic Sovereigns to establish a Paper Currency.—By
E. B. COWELL, M. A.

The old motto "*Ex Oriente lux*" holds true in many departments of science; Europe is no doubt indebted to Asia for many an invention and idea; but if there be one science above others, which is all her own and where the Western mind is utterly unindebted to the East, it is that peculiar discovery of modern times, Political Economy. In fact it is not under despotisms like those which have prevailed from time immemorial in the great nations of Asia, that such a science could even take root, much less bear fruit. And yet it is singular, here and there, in the moral and philosophical treatises of Eastern authors, to come upon imperfect attempts to develop some of its principles; and in the same way, amid the bloody annals of Eastern kings, to trace an occasional abortive effort to anticipate the financial measures of modern times. Their very failures, in fact, are deeply interesting. They tell us that mere physical might is powerless in the moral world; that that magic influence of national credit, which is the firmest pillar of an empire's stability, is beyond the tyrant's control, in spite of his armies.

It may not be uninteresting at the present time to trace a series of these attempts in one particular direction,—I refer to the endeavours of the kings of China, Persia and India to establish something like a paper currency in their respective dominions. These attempts were made during the thirteenth and fourteenth centuries; they all failed after a longer or shorter period, and probably from the same causes.

We first meet with the idea in China. It is said that the plan was originally started by a native Chinese monarch of the Song dynasty, two centuries before the Moghul conquest; and we certainly find it

in full force under the early successors of Chenghiz Khán. After the expulsion of the Moghuls in 1366, the founder of the native or Ming dynasty tried to revive it, but the attempt appears to have failed.

We have the accounts of two travellers, who visited China during this period, to confirm this account. The first is Marco Polo who resided in the court of the Emperor Kublai Khan from about 1274 to 1291. Kublai Khan, one of the most enlightened of the Moghul monarchs, had been crowned Great Khan (or more properly Ká-án) of Northern China in 1260; in 1280 he overthrew the Song dynasty in the South, and he reigned over all China (founding the Yuen dynasty,) until his death in 1294.

The second is the Arabian traveller Ibn Batúta, who visited China as ambassador from the Sultan of Delhi, Muhammad Toghluk, in 1345, and seems to have spent about a year there. He left during the troubles which followed the accession of the last of the Yuen or Moghul dynasty.

Marco Polo's narrative is as follows.*

"With regard to the money of Kambalu,† the great Khan may be called a perfect alchemist, for he makes it himself. He orders people to collect the bark of a certain tree, whose leaves are eaten by the worms that spin silk. The thin rind between the bark and the interior wood is taken, and from it cards are formed, like those of paper, all black. He then causes them to be cut into pieces, and each is declared worth respectively half a livre, a whole one, a silver grosso of Venice, and so on to the value of ten bezants. All these cards are stamped with his seal, and so many are fabricated that they would buy all the treasuries in the world. He makes all his payments with them, and circulates them through the kingdoms and provinces, over which he holds dominion; and none dares to refuse them under pain of death. All the nations under his sway receive and pay this money for their merchandise, gold, silver, precious stones, and whatever they transport, buy or sell. The merchant often brings to him goods worth 400,000 bezants, and he pays them all in these cards, which they willingly accept, because they can make purchases with them throughout the whole empire. He frequently commands

* Murray's transl. p. 137, (ch. 26.) which I follow as more recent than Marsden's.

† Khán-bálik or Pekin.

those who have gold, silver, cloths of silk and gold, or other precious commodities, to bring them to him. Then he calls twelve men skilful in these matters and commands them to look at the articles and fix their price. Whatever they name is paid in these cards, which the merchant cordially receives. In this manner the great sire possesses all the gold, silver, pearls and precious stones in his dominions. When any of the cards are torn or spoiled, the owner carries them to the place whence they were issued, and receives fresh ones, with a reduction of 3 per cent. If any man wishes gold or silver to make plates, girdles or other ornaments, he goes to the office, carrying a sufficient quantity of cards, and gives them in payment for the quantity he requires. This is the reason why the Khan has more treasure than any other lord in the world; nay, all the princes in the world together have not an equal amount."

It has been sometimes said that Marco Polo saw *only* the court and the servile obsequiousness of the courtiers; but this is by no means the case. He continually mentions in the course of his travels the fact of the paper currency in the provinces. Thus in Chap. 56, (ch. 49 in Marsden) in his account of Cyn-gui (Chintigui in Marsden,) he says, "they have no money except paper," and in that of Ca-cian-fu (Pazafu in Marsden,) more than two months' journey distant from Cyn-gui, "they are subjects of the Grand Khan, and his paper money is current among them." Again in Chap. 60 (ch. 50 and 51, Marsden,) we have the same remark made about the cities of Sin-gui and Cin-gui, which are described as "full of merchandise and arts and paying a large revenue to the sovereign." Again in Chap. 64 in describing the province of Pau-chym, we have, "the people are artificers and merchants, and have abundance of silk; through all that country the Khan's paper money is circulated." Beside these, there are at least a dozen similar allusions in his travels through various parts of the empire.

There doubtless may be some exaggeration in his narrative; but the very fact of the system's continuance seems to prove that it was by no means the oppressive system which it appeared to foreigners, and in which character indeed it possessed such attractions to the grasping despots of Persia and India.

The substance of Marco Polo's account is amply confirmed by the very similar narrative of Ibn Batúta, who visited the same court

nearly fifty years afterwards and found the same system still pursued under the later princes of the dynasty. The dynasty was then verging to its fall—it had indeed rapidly followed the law of all Asiatic dynasties—what Gibbon calls “the unceasing round of valour, greatness, discord, degeneracy and decay.” Marco Polo had found the Moghul power in all the youthful vigour of conquest; Ibn Batúta finds it a decrepit stock, “*primo nutans casura sub Euro*.”

The following is the Muhammadan traveller’s account, as we read it in the edition lately published at Paris by MM. Defremery and Sanguinetti (Vol. IV. p. 259.)

“The inhabitants of China do not use pieces of gold or silver in their commercial transactions, and all coins that come into the country are melted into ingots. They buy and sell by means of pieces of paper, each of which is as large as the palm of the hand, and bears the Sultan’s mark or seal. Twenty-five of these notes are called a *bálish*,* which means the same as our *dínár*. When any body finds that his notes are worn out or torn, he carries them to the office which is just like the mint with us, and there he has new ones given him in place of the old. He has nothing to pay for this, for the officers who have the charge of supplying these notes are paid by the King. The management of the office is entrusted to one of the principal Amirs of China. If a person comes to the market with a piece of silver money (*dirrhem*) or even of gold (*dínár*), in order to purchase any thing, no one will take it or pay him any regard, until he has changed it for notes, and then he can buy what he pleases.”†

The chief difference between these two narratives is the absence, in the latter, of the heavy seignorage of 3 per cent. which had been levied in Marco Polo’s time. Dr. Lee in his translation adds a sentence to explain it, “This is done without interest,—the profit arising from their circulation accruing to the King;” but these words have not been kept in the late critical recension of the text.

* Dr. Lee in his translation wrongly gives the name as *Shat*, reading *b’il-shat* instead of *bálish*.

† In the curious account of Ibn Batúta’s interview with the shekh (iv. p. 275), we have an instance of the currency of these notes, when one of the saint’s companions gave him some paper-money (بوالشت من الكاغد) and said, “Take these for your hospitable entertainment and depart.”

The Jesuit, Du Halde, in his "Description de l'empire de la Chine," states that a few of the notes which were issued under these early Chinese kings, are still in existence,* and they are regarded with superstitious reverence. They are greatly prized as talismans to protect houses from evil, and it is held as an omen of the greatest good fortune, if, in building a new house, they can get one to hang to the main beam. He gives a picture of one of these notes, on which we find the word *tschao* as the current name.† The following is Du Halde's translation of the Chinese inscription, "La cour des trésoriers ayant présenté cette requeste, il est ordonné que la monnoye du papier ainsi marquée du sceau imperial des Ming, aye cours et soit employée, de même que la monnoye de cuivre. Ceux qui en feront de fausse, auront la teste coupée. Celui qui les aura accusés et amenés, sera récompensé de deux cent cinquante Taels. De plus on lui donnera les biens meubles et immeubles du coupable. Fait à telle année, tel mois, tel jour du regne de Hong vou."

We now turn to Persia, where we shall find a similar but less successful attempt to have been made.

In the dissolution of the empire which followed Chenghiz Khán's death in 1226, and its division among his sons, his grandson Hulákú Khán turned his arms to Persia, and after completing its conquest by the taking of Baghdad and the overthrow of the Abbaside dynasty of Caliphs, established himself on the vacant throne, founding the Il-khání dynasty. He died in 1264 and was succeeded by his son Abáká Khán, who governed wisely and consolidated his father's conquests. But after his death, in 1283, a scene of discord and confusion ensued, until Ky Khátú succeeded to the throne in 1291. He found the finances in great disorder, but instead of attempting to restore them by economy, he plunged into all kinds of excess, and left everything to a Wazír who was himself as extravagant as his master. At length in 1294 affairs appear to have reached a crisis, and the minister, at his wits' end to provide for the current expences of the

* There is an interesting communication in the Royal Asiatic Society's Journ. Vol. XIII. on the private paper currency now in use in some parts of China.

† *Tschao* is found in De Guignes' Chinese Diet., where it is explained, "papyrus sigillata quâ olim sinenses loco argenti utebantur."

state, proposed to introduce into Persia the scheme of an inconvertible paper currency, which the branch of Chenghiz Khán's family that reigned in China, was then carrying out with some success. The eastern historians tell us that the minister consulted the Chinese ambassador, and obtained from him the details of the measure; but Sir John Malcolm plausibly suggests that Marco Polo may very probably have had something to do with it. He arrived in Persia about this very time, having accompanied the train of a princess, whom Kublai Káán had consented to give in marriage to Arghún Khán. On their arrival in 1292 or 1293 they had found that monarch dead and his successor Ky Khátú on the throne. Marco Polo remained in Persia nine months, residing at the capital; and he reached Venice in 1295.

Whether, however, the keen Venetian traveller was consulted or not on the scheme, it was resolved by the king and his minister that the attempt should be made. It proved, as we shall see, a miserable failure, but the record of it remains, forming in fact the one circumstance of interest in Ky Khátú's imbecile reign.

I subjoin the following account of the measure from Mirchond's history.* I regret that I cannot present the contemporary account of Rashíd-ud-dín, who wrote his history, the *Jámi'-ut-Tuwárikh*, under Gházán Khán (Ky Khátú's successor) and his son Uljái-tú Khán; but unfortunately the only MS. of that rare and interesting work which is in the Society's library, is incomplete, and this part of the history (which occupies the first volume and is often called the *Tárikhi Gházání*) is missing.

Mirchond relates how the Sultan's Chancellor of the Exchequer, (صاحب دیوان) Sadri Jehán, used every means in vain to meet the increasing financial difficulties of the empire. He tried loans, but these only increased his embarrassments; and what with the Sultan's extravagance and his own, the treasury became empty, and he had no money for the current expenses of the government. In the midst of these perplexities, an officer of the Revenue department, named

* M. de Langlès published a similar extract from the *Habíb-us-siyar* (written by Mirchond's son, Khondemír) in the *Memoires de l'Institut* (Literature, &c.) vol. IV. p. 129. Mirchond wrote his history towards the close of the 15th century.

'Izz-ud-dín Muzaffar, gave him an account of the paper currency of China, called chau, and recommended that a similar expedient should be adopted in Persia. " 'In this way,' he said, 'the doors of business will again be opened, and the wealth of the country will return to the treasury without loss or distress accruing to any individual.' " The remainder of the narrative shall be given in Mírehond's words.*

" In these perplexing circumstances, the Chancellor of the Exchequer went with Pulád Changsánik, the ambassador at that time from the emperor of China, and laid before the Sultan Izz-ud-dín's proposal. Now the external aspect of the plan promised an ample field of gain, and a diminution of the burdens of traders, and a soothing of the hearts of the poor,—and Ky Khátú Khán, with all promptitude, issued a decree that throughout his empire no buying or selling should be conducted by means of the current coin, that men should draw the line of oblivion over the weaving of gold-embroidered cloth except for the especial use of the king and his nobles, and that they should abstain from the manufacture of every article which involved the consumption of gold or silver; and that the working in gold or the smelting of silver be left henceforth to the yellow cheeks of lovers and their running tears. In fine, by the seductive instigation of this monster in human shape, Izz-ud-dín Muzaffar, who caused his beneficent master to be thus implicated in such an evil design,—the emperor of sea and land appointed certain of his nobles to carry out this perilous measure, and sent them into the provinces of Iráki-Ajam and 'Arab, Diyárbakr, Rabí'ah, Mayyáfárikín, Ázarbíján, Khurásán, Karmán and Shíráz. In every city they built a chau-khánah; and exchangers, writers, and other treasury officers were appointed, and every where a certain sum of money was expended in the materials for the issue.† At the publication of this order, the different nations were filled with astonishment and confusion.

" Now the form of the chau was an oblong piece of paper, and certain words in the language of Cathay were written on it, and on both sides was the formula of belief, "There is no God but God, and Muhammad is his prophet," and beneath this the words Yiranjín Túrjî, which were the titles which the Káans of China had conferred

* See the Bombay lithographed edition.

† This is the reading of the Society's MS.

on the kings of Persia. In the middle of the paper was drawn a circle, and starting from the centre was written the value of the note, which varied from half a dirrhem to ten dirrhems. Certain lines were also written on it, the substance of which was as follows,—that the emperor in the year 693 (A. H.) had issued these auspicious chaus; that all who altered or forged them should be summarily punished with their wives and children, and their property confiscated to the treasury; and that when these auspicious notes were once in general circulation, poverty and distress would vanish from the people, vegetables would become cheap, and rich and poor would be equal. Certain poets and able authors of the time published their productions in praise of the scheme, to flatter the king and the minister; this single couplet is given as a specimen.

If the chau (چاو) becomes current in the world,
The glory of the empire will be eternal (جاودان).

“Since it was part of the edict that all who melted silver or gold in their trades, should cease to work any longer therein, and these men had accordingly forsaken their businesses, it was provided, as a means of their subsistence, that each of them should receive a certain fixed amount from the chaukhánah. It was also ordered that whenever the chaus became obliterated by use, they should be brought to the chaukhánah and new given in exchange. The Persian merchants by sea, who traded with foreign countries,* were to bring, on the eve of the voyage, their chaus to the mint and there receive gold in exchange. In fine, in the month Zú'l ka'dah, in the year 693, chaus were first issued in Tabríz; and in consequence of the stringent orders given, for two or three days people used them in buying and selling. For an order had been issued that every one should lose his head who refused to accept the new currency. Many of the inhabitants of Tabríz left the place and carried away their goods and provisions from the bazar, so that this city, which is called the little Misr, became as empty of people as a lover's heart of patience. The cries of young and old rose to heaven, and the common people in the Friday's assembly began to exclaim loudly against the tyrannous

* I have corrected the obscure reading of the Bombay edition to از بلاد یاجی آمدشده می نمایند, the reading of the Society's MS.

measure and implore heaven to send them aid; and loud were their curses against Izz-ud-din and those who were his partners in the scheme.

“At last with common consent they attacked him, and, having killed him with his followers, broke out into rebellion. All the movements of the caravans were stopped in that district; and robbers and lawless men lay in wait in the streets and gardens, and if any poor wretch by dint of a hundred stratagems had managed to get a little corn or a bag of fruit, they took it away from him, and if he attempted to resist, they said to him “take these ‘auspicious chaus’ then in exchange.” At length when the matter became really serious and the knife, as it were, touched the bone, all the doors of business were closed and the imperial revenue seemed abolished. The nobles and amírs with the Chancellor of the Exchequer then went to the king, and represented to him that the institution of chaus had produced ruin to the subject and emptiness to the imperial treasury, and if this state of things continued many days longer, the glory of the empire would pass away, and no subjects be left in the realm. The Sultan, having heard the words of these faithful counsellors, issued orders for cancelling the chaus, and, the inhabitants consequently returning to their homes, in a short time the city and bazar of Tabríz resumed their original appearance.”

Short lived, however, as this measure appears to have been, its consequences were not so transitory; for it brought speedy ruin on the unfortunate monarch, who had been thus duped by his minister’s golden promises. A few months afterwards, a rebellion is raised by the nobles, and Ky Khátú, after a brief struggle, is dethroned and put to death.

But ill-fated as the measure had proved in Persia, the scheme of transferring all the gold and silver of the kingdom into the imperial coffers without the loss being felt by the subjects, was too tempting to the ignorant mind of an oriental despot, to be at once abandoned. We never hear of it again in Persia, but in the next century we find it attempted in India by that strange mixture of the grandest and the basest of Imperial qualities, the Sultán Muhammad Toghluk of Dehli (1325—1351). Although in this case copper, not paper, was adopted, still as Ferishta expressly tells us that it was done in imita-

tion of the Chinese system of *chaus*, we may allow it to stand in the same series of attempts with the foregoing.

The great authority for these later pre-moghul dynasties is the *Tárikhi Fírozsháhi* of Zíá Barní,—an edition of which is now in the press, to appear in the *Bibliotheca Indica* under the auspices of our Society. Of Muhammad Toghluk's reign he writes as a contemporary, and the following is his account of this remarkable measure.

اندیشه سوم سلطان محمد که واسطه خرابی ملک و وسیله جرت و قوت شوکت متمدان هندوستان و سرتابان بزرگ و با ثروت و نعمت شدن سایر هندو گشت معامله بیع و شرو اظهار مهرمس بوده است و از جهت آن که سلطان محمد را از باعث همت عالیه در خاطر افتاد که ربع مسکون را می باید گرفت و در تحت امر خود می باید آورد و برای این مهم لایمکن چشم بی اندازه و بی حد در بایست شد و چشم بسیار بی مالهای حاضر دست نمی داد و در خزاین از کثرت اعطاء و ایثار خرقی بزرگ افتاده بود سلطان محمد مهرمس پیدا آورد و فرمان داد که مهرمس را در خرید و فروخت چنانچه مهر زرو نقره جاری است همچنان جاری گردانند و از اعمال اندیشه مذکور هر خانه از خانهای هندوان دار الضری پیدا آمد و هندوان بلاد ممالک کرورها و لکها از مهرمس ضرب کنند و هم از آن خراج می دادند و هم از آن اسب و اسلحه و نفایس گوناگون می خریدند و رانگان و مقدمان و خوطان از مهرمس با قوت و شوکت شدند و خرقی در ملک پیدا آمد چند گهی نگذشت که دوردستان تنکه مس را بدل می ستدند و آنجا که از حکم سلطان خوف می کردند تنکه زربعد تنکه مس رسیده و هر زرگری در خانه خود مهرمس می زد و از مهرمس خزانه پر می شد و مهرمس چنان خوار و زار شد که حکم سنگریزه و سفال گرفت و قیمت مهر قدیم از نهایت عزت یکی بچهار و یکی پینچ رسید و چون در چهار طرف در خرید و فروخت خرقها افتادن گرفت و تنکه مس از کلوخ خوار تر شد و بهیچ باز آمد سلطان محمد حکم خود را در باب سکه مس فسخ کرد و با صد غضب باطن فرمان داد تا بر هر که سکه مس موجود باشد در خزانه رساند و عونی آن مهر زر قدیم از خزانه ببرد و چندین هزار آدمی از طوایف مختلف که از سکه مس هزارها در خانه موجود داشتند و دل از آن برداشته بودند و بجای آوردند مس در گوشه انداخته تنکه مس را در خزانه رسانیدند و بدل آن مهر تنکه زرو نقره و ششگانی و دوگانی در خانه بردند و چندان تنکه مس در خزانه در آمد که تودها از تنکه مس مثل کوهها در تغلقاباد بر آمده است و بدل سکه مس

* So in MS. but query *خوطان*, agents, sircars?

گنجها از خزانه بیرون رفت و یک خرق بزرگ که در خزانه افشار بواسطه تنگه مس بود و از جهت آن که فرمان سلطان محمد در باب سکه مس نفاذ نیافت بلکه از واسطه تنگه مس مبلغی مال از خزانه ضایع شد خاطر سلطان محمد از رعایاء بلاد عمالک متغیر گشت

“Another project of the Sultán's, which brought ruin upon the empire, was his interference with buying and selling, and issuing copper money. Since Sultán Muhammad in his lofty ambition had conceived the idea of subduing the inhabited part of the world, and for this impracticable design were required countless followers and attendants, and these could not be procured without ready money, and the treasury laboured under emptiness in consequence of the royal munificence,—the Sultán for all these reasons invented his copper money; and he issued a decree that in all purchases and sales these copper coins should be current as those of gold and silver had been. In consequence of this measure every Hindu's house became a private mint, and the Hindus of the various cities of the empire had lakhs and crores of these copper pieces coined. With these they paid their tribute, and with these they bought horses and arms and costly goods of every description; and the ranas, district officers and sircars gained immense fortunes, but with serious detriment to the empire. Nor was it long ere the distant provinces refused to take these copper coins in exchange; and even there, where the king's edict was feared, a tanka of gold rose to the value of a hundred copper pieces. Every goldsmith coined copper pieces in his own house, and the treasury became filled with the coins. At last the copper money became so depreciated that it was reckoned only like shingle or potsherds, and the value of the old coins from the excessive estimation in which they were held, was increased four or even five fold. When such ruin everywhere fell upon commerce, and the copper tokens became viler than bricks, and were of no use whatever, Sultán Muhammad repealed his edict, and issued a new order, though with the fiercest wrath within his heart,—that every one who had the copper coin, might bring it to the treasury and exchange it for the old gold money. Forthwith thousands of men from different quarters, who had thousands of these tokens in their houses, and utterly sick of them had tossed them into holes and corners with the pots and pans, brought them to the treasury and received gold

and silver money in exchange.* In such quantities was the copper carried to the treasury that there were heaps of it in Toghlakábád like mountains, while immense sums passed out from the treasury in exchange for it, and this was one great evil which fell upon the state from this measure. And again since the Sultán's edict had failed in bringing the scheme to pass, and the copper tokens had only absorbed a large portion of the revenue, the heart of the Sultán became more and more alienated from his subjects."

Ferishta's account is based upon that of Zíá Barní, but as he supplements it from other authorities, it may not be uninteresting to subjoin it. I may remark that neither of the historians gives us any date for this measure; it probably took place in the middle of Muhammad's reign, but it is rather singular that Ibn Batúta, who spent some years in his court and has given copious anecdotes of his generosity and tyranny, should have omitted all mention of the project.

"The history of the issuing the copper gold† is as follows:—

"When the king desired, like Sekander, to conquer the seven regions, and his pomp and treasury would not suffice to meet all his demands, in order to attain his object, he invented a copper currency, and issued orders that just as in China a paper gold is current, so too in Hindustan they should coin copper gold in the mint, and make it pass current instead of silver or gold money, and employ it in all buying and selling. Now the Jau (جاو) of China is a piece of paper on which is written the name and title of the king, and the people there use it commonly instead of silver and gold. But this measure did not succeed in Hindustan. The Hindus in the empire brought immense quantities of copper to the mint and obtained‡ in this way lakhs and crores of stamped coins, and having purchased goods and arms, sent them to foreign countries and sold them there for silver and gold. The goldsmiths also forged the royal stamp and

* I cannot explain the words which follow this وششگانی و دوگانی. They would seem to mean "by sixes and twos,"—can this refer to the rate of exchange? More probably, however, they are the names of gold or silver coins.

† I have given a literal version of the printed edition, as General Briggs' translation, generally so excellent, is here unusually wide of the original.

‡ General Briggs adds "by a bribe to the officers."

coined money in their own houses. In this manner after a time it came to pass that the distant provinces refused to take the copper money and opposition began to break out on every side. At last the discontent gradually spread until the copper tokens lost their estimation even in the capital and its neighbourhood. The king seeing this state of things began to repent of his order, and as there was no help for it, he issued an order that every one who brought the copper coins to the treasury, might receive gold and silver in exchange. His hope was that by this means perhaps the copper tokens would again rise in general estimation and maintain their currency in commercial transactions. But the people, who in despair had flung their copper tokens like stones and bricks in their houses, all rushed to the treasury and exchanged them for gold and silver. In this way the treasury soon became empty, but the copper coins had as little circulation as ever, and a very grievous blow was given to the state.”*

I have thus endeavoured to give a sketch of all that is known respecting these three attempts to introduce a total change into the commercial and financial ideas of the semi-civilized nations of Asia. Oriental historians alas! have only eyes for battles and court-shows,—the condition of the people and the progress of ideas lie entirely out of the range of their observation; and hence all that we learn from them respecting these schemes is disappointing and barren. In two of the instances mentioned, Persia and India, the experiment immediately failed; for the circumstances under which it was tried were eminently unpropitious to its success. The reigning monarchs were, the one an impotent, the other a furious, tyrant; the state was suffering all the evils of conquest and despotism; and the only aim of the monarchs in introducing the scheme at all, was to rob their subjects the more easily. It was welcomed as a new engine to wring their gains into the treasury,—that the Sultan’s round of extrava-

* Though not strictly bearing upon the question, I cannot refrain from alluding to the history of the water-carrier who saved Humáyún’s life at Chonsa. He was rewarded by sitting on the imperial throne for half a day. He employed his brief reign in providing for his family and friends; and to commemorate it, he had his beestie’s skin cut up into leather rupees which were gilt and stamped with his name and the date of his reign as sovereign prince!

gance and profligacy might continue unbroken. It was begun only to gratify a tyrant's selfishness, and of course it miserably failed. But as far as we can tell from our meagre accounts, it was much more successful in China; it was once extensively used by the native sovereigns; and Marco Polo in his various travels abundantly proves that the royal notes of the Moghuls had a wide circulation through the different provinces. As long as the Moghul dynasty governed well, the experiment seems to have succeeded; and it certainly lasted under them for nearly a century. We cannot tell the exact causes of its final failure; but it is not improbable that, as the Moghul dynasty grew debased, the effeminate puppets who succeeded to such great Kings as Kublai Káán, under the guidance of designing ministers, kept increasing the issues, in the vain idea that it was an inexhaustible source of revenue, until it ended in a revolution. A change of dynasty would introduce new feelings—the old paper currency would naturally become associated with the remembrance of the later evils, and the earlier benefits be forgotten; and national hatred would link it with the detested name of the expelled Moghul dynasty. Under these circumstances we need not be surprised at the failure of the attempt which the Chinese successors to the Moghuls made to revive it.

I need not add to the length of this paper, by subjoining any detailed remarks on the wide difference between the circumstances of the present time and any of these three previous periods,—more especially the Indian period under Mohammad Toghluk. India *now* and India *then* in every respect present a perfect contrast. With regard to China, the partial success of the plan there seems highly encouraging; and every circumstance which in that case tended to impair public confidence, will be absent in the present time. With all those drawbacks, we know that the “tschaos” did circulate far and wide; and in Marco Polo's time they were apparently received with good will; and if this effect followed under a semi-barbarous despotism in China, why should it not follow to a far wider extent under a paternal and civilised government in India?

On recent Russian Researches.—By Rev. J. LONG.

After searching in vain among Europeans in Calcutta for copies of the Transactions of the Imperial Academy of St. Petersburg, I procured them at last in the Library of a *native* friend. It is to be deeply regretted there is so little literary and scientific intercourse between St. Petersburg and Calcutta, for the Russians have long laboured with great research in the investigation of the literature and antiquities of Asia and particularly of Central Asia; and with the extension of Russian power and influence to the frontiers of India, we may expect that much light will be thrown on the mental and social state of the people of Tibet, Bokhara, Khorasan, Kirghistan and Ariana. Russia from the prominence she assigns to linguistic qualifications among her functionaries, and from her position as a Semi-Asiatic power, seems preeminently marked out as a pioneer in Asiatic Science and Ethnology; the works she has already published and the liberal patronage of the Czar afford bright hopes for the future.

The Imperial Academy of St. Petersburg was highly favored by Alexander the 1st of Russia, and the late Emperor shortly after his accession attended with his family its anniversary and patronised it in various ways by appointing its members to oriental and scientific missions and making grants of money for special oriental objects. The Academy has, on various occasions, encouraged and aided scientific voyages such as those of Pallas, Gmelin; though it has of late years rather helped with its counsel while the Imperial Government have defrayed the expenses, as in the cases of—M. Baer who spent three years 1853-57 investigating the fisheries of the Caspian.—M. Helmersen on geological researches in Olonez.—M. Schrenck, zoological and ethnological enquiries in the countries bordering on the Amour.—Middendorffs and Borstch's zoological and botanical researches on the coasts of the sea of Aral.—M. Abich on the geology of the Caucasus.—M. Struve, trigonometrical surveys between the Atlantic and Caspian.

In 1856, an annual prize of 3000 roubles was founded by Count Ouevarof to be adjudicated by the Academy for encouraging works on Russian history and the drama. Previous to that eight annual

prizes were instituted in 1821 called the Demidoff Prizes. In 1855, the works for the prize amounted to twenty-five, of these eight were on History, three on Statistics, two on Jurisprudence, one on Geography, two Mathematical, one Natural Science, two Rural Economy, one Medicine, four Philology. All were in the *Russian* language, indicating a revulsion from the old practice of writing in French and German. Prizes were in 1857 assigned for the following works—the Flora of Lake Baikal—Fossil fish of the Silurian system near the Baltic—History of Russian legislation to the time of Peter the Great—Hoffman's tour to the Northern Uralian mountains—The Shipwrecks and Burnings in the Russian navy—The inferior algæ and infusoria—History of the Moscow Academy—Systematic logic. One subject of the prize for 1858 was an historical exposition of and statistical researches on the emancipation of the peasantry in the different states of Europe.

In the department of Oriental Literature in 1857, we find Monsieur Dorn actively pursuing his researches on the Muhammadan sources serving to a history of the *people on the South Coast of the Caspian*; he has published two volumes of Persian texts on the subject. Monsieur Khanikoff has presented a memoir of the *Caucasus* and a notice of the journals of the *Persian traveller Zeinel Abidin*: valuable contributions of *Sassanian coins* with dissertations on their dates have been made. Several members of the Russian Academy are investigating the idiom, history and literature of the *Afghans*.* Others are engaged on *Kurd history*: Monsieur Lerch, a Kurdish scholar, was sent by the Academy to live among a number of Kurdish prisoners brought into the Government of Smolensk for the purpose of learning the Kurdish colloquially; the Russian Consuls and Functionaries have given warm co-operation in these investigations into Kurdish literature so important to a knowledge of the Iranian race. Monsieur Schiefner is labouring on the Buriat, one of the purest offshoots of the Mongolian language as also on a Mongolian translation of the *Vetäl panchabinsati*, which, like the Hitopadesh, has been translated into many languages.

M. Kunik has written a memoir on *Russian Expeditions to the*

* On a recent occasion while the English Government subscribed for five copies of a Pushto Dictionary, the Russian authorities subscribed for two hundred.

Caspian coasts in the 9th century. M. Brosset has published a Dissertation on *political relations between Russia and Georgia* since 1586, and also a *History of Georgia*, the work of eighteen years' hard labour. Great interest is taken in pointing out the connection between the Zend and Slavonic languages. Wasselief of Kazan is engaged in a series of researches into Buddhism and also into the Tibetan language—while Schiefner in 1854 read an interesting paper on the Ceylon, Nepal and *Asam* coins in the Academy of St. Petersburg.

During the year 1857 Memoirs were read on the following subjects :

The nebulosity of Orion, by M. Otto Struve.

The Secular perturbations of the great planets, by M. Perevostchikof.

Researches on the elasticity of metals, by M. Kupffer.

The quickness of rotation on the current produced by magneto-electric machines, by M. Leng.

On simplifying and expressing popularly the forces of electricity, by M. Jacobi.

On isothermal lines in Russian Maps, by Vesseloosky.

Crystallised combinations of Hydrocarbures neutres, by M. Fritzsche.

Action of azotic acid &c. &c. by Ditto.

Contributions to a Geology of Russia, by M. Kokeharof.

On salt genuine and its geological site in Armenian Russia, by M. Ebich.

On certain fauna and flora near Lake Aral, by Ditto.

The Geological Map of the Caucasus, by Ditto.

An inflammable gas in the Crater of Vesuvius and its periodical changes, by Ditto.

The vegetation of the Amour, by M. Ruprecht.

The flora of Russia, Umbelliferæ of Kamskatkha, by Ditto.

On Embryos formed without fecundation, by Ditto.

The changes produced in the soil of Novogorod by drainage, by M. Jezelnof.

On the Hareng fish of the Caspian, by M. Baer.

The Mammiferæ insectivores of Russia.

Literary Intelligence.

Mr. F. E. Hall writes from America, in a letter dated Dec. 24th.

“ You may not be aware that a translation of the *Sūrya-siddhānta* is coming out in the Journal of the American Oriental Society. Part has appeared ; and the rest is ready for the press and will probably be published by next April.” The translation is made by the Rev. — Burgess, assisted by Professor Whitney. Mr. Hall elsewhere remarks, “ if I had Pundit Bápú Deva at my side, I think I could considerably improve it.” Our learned coadjutor will be glad to learn that the translation by his fellow editor, is in the press, and will soon be issued in the Bibliotheca.

Professor Müller writes from Oxford, in a letter dated April 1st.

“ The *Sūrya-siddhānta*, as you probably have heard before now, has been edited and translated (revised by Whitney) in the Journal of the American Oriental Society ; it seems very carefully done with diagrams and notes. Biot has lately published some articles in the Journal des Savans on Indian Astronomy, reiterating his opinion that the Hindus borrowed from the Chinese. Whitney believes it ; I shall never believe it ; as little should I believe that the Greeks borrowed their Astronomy from the Goths. You ask me to mention some works which are wanted for the Bibliotheca Indica. Would it be possible to prepare a complete edition of Kumārila ? He is a most instructive writer, and there are no complete MSS. of his *Tantravārtika* in any library in Europe. Is the *Mahābhāshya* ever to be continued ? The plan to publish the *Vaiśeṣika Sūtras* with commentary is a very good one. What could be done for the *Purānas* ? Could you get an edition of the *Vāyu Purāna* ? This seems to be one of the most original. However, the text of the *Vishṇu Purāna* too would be acceptable. If you think it possible to publish a collection of the *Upanishads*, excluding only the most modern compilations, that would be equally useful... The Library of the East India House is to be removed to the Board of Control ; happily it has been saved from being swallowed up by the British Museum. I hoped for a time we might have got all the MSS. for the Bodleian, but this was not to be... Aufrecht is going on with the Catalogue of our Sanskrit MSS., part of which is out, but I do not know whether it is in

the trade. His edition of the Unádi Sūtras is very useful and carefully edited. There is not much doing in Sanskrit on the Continent. ... I received the separate copies of the Essay on Writing which was inserted in the Journal. Böhrling has written an Essay in answer to my hypothesis, but it contains no new facts, and does not seem to me to remove any of the difficulties which I stated."

We have received during the present year two new parts of Messrs. Böhrling and Roth's Sanskrit Dictionary, which carry the work down to तावन्. It is seldom that we can detect any omissions in this excellent work; but we may venture to notice an oversight in the latter part. Under the word डम्बर we have only a quotation from the Mahābh., where it is a proper name, followed by the remark, "Welche Bed. hat aber das Wort, Mālatī-Mādhava 14S-S?" The learned editors appear to have overlooked the fact that this obscure word is a favourite with Bhavabhūti. It occurs in the Māl-Mādh., p. 3.3 in the phrase डम्बरनामानः where the scholiast explains it by प्रसिद्ध (Prof. Wilson translates it "possessing names of note."). In the prologue to the Mahāvīrach. we have उडुम्बराः* in a similar sense. The use of this word in Māl. M., p. 14S, 8,

जम्भाजर्जरडिम्बडम्बरघनशोभकदम्बदुमाः

is by no means so infrequent as the editors' remark would lead us to suppose. The same meaning (as applied to the blossoms of the Kādamba) occurs in an earlier part of this very play (p. 4S, last line) in the lines

प्रथमप्रियावचनसंश्रवस्फुरत्पुलकेन संप्रति मया बिडम्ब्यते ।

घनराजिनूतनपयस्समुच्चण्णद्वकुलकदम्बडम्बरः ।

where the scholiast explains it by प्रपञ्च; and a parallel is also to be found in the Mahāvīracharita (Trithen's ed. p. 99, 17) where it is applied to the masses of clouds,

यदि संयताः कुन्तलाः

किमम्बुवहडम्बरैर्यदि तनूरियं किं श्रिया ।

C.

* So the Calcutta edition, explained by Pundit Tārānāth Tarkabāchaspati डम्बरमुत्कर्षनधिगताः The London edition reads faultily उडुम्बराः.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR APRIL, 1860.

The Monthly General Meeting of the Asiatic Society, was held on the 4th instant.

A. Grote, Esq., President, in the Chair.

The proceedings of the last Meeting were read and confirmed.

Presentations were received—

1. From Rajah Kundurpeshwar Sinha, through the Collector of Burdwan, four silver coins.

2. From the Royal Academy of Sciences at Stockholm, a copy of *Eugenies Resa, Helt 6*.

3. From Henri de Saussure, of Geneva, Parts 8 and 9 of *Mono-graphie des Guêpes Sociales*.

4. From Major H. L. Thuillier, a map of the China coast.

5. From Captain Jethro Fairweather, commanding the ship *Farshire*, a skull of *Delphinus eurynome*, from the Bay of Bengal; a very beautiful and perfect specimen.

6. Mrs. Edwards, two fishes from Port Blair, one of them a *Serranus* new to the Museum.

7. Received by Banghy Dâk, the skin of a *Lagomys*.

8. From the Curator, a fine stuffed specimen of *Rupicola sanguinolenta*, Gould.

The following gentlemen, duly proposed at the last Meeting, were balloted for, and elected ordinary Members.

J. E. T. Aitchison, Esq., M. D.; A. K. Dyer, Esq.; H. Braddon, Esq.; and Alonzo Money, Esq., B. C. S.

Dr. M. Haug, of Poona, was also balloted for, and elected a corresponding member.

The following gentlemen were named for ballot as ordinary members at the next meeting.

The Right Hon'ble J. Wilson, proposed by the President, and seconded by Sir Bartle Frere.

R. Temple, Esq., B. C. S., proposed by the President, and seconded by Col. Strachey.

Charles Hobhouse, Esq., B. C. S., proposed by the President, and seconded by Dr. Kay.

Dr. H. Halleur, Professor of Natural Philosophy, Presidency College, proposed by Major H. L. Thuillier, seconded by Mr. Atkinson.

Captain Stanton, Bengal Engineers, proposed by Col. Baird Smith, seconded by Mr. Atkinson.

Captain Adrian D. Vanrenen, late 71st B. N. I., Revenue Surveyor, Jhansie, proposed by Major Thuillier, seconded by Major Sherwill.

Babu Jogindra Narain Roy, proposed by Babu Rajendralall Mittra seconded by the President.

Communications were received—

1. From R. B. Chapman, Esq., Under-Secretary to the Government of India, a copy of a letter from the Superintendent of Port Blair, reporting particulars of friendly interviews held with the aborigines of the Andaman Islands.

2. From Babu Radhanath Sikdar, an abstract of the Meteorological Observations taken at the Surveyor General's Office, in October last.

The Secretary submitted the following statement, shewing the amount of the Society's Income derivable from the payments of members for the last 5 years.

	No. of Members.	Amount of subns. at Rs. 64.	Amount of en- trance fees at Rs. 32.	Total In- come.
Jan. 1, 1856, ..	123	8192	416	8608
Do. 1857, ..	131	8384	608	8992
Do. 1858, ..	116	7424	192	7616
Do. 1859, ..	96	6144	64	6208

	Number of Members.			Amount of Subscriptions.				
	Resident.	Non-Resident.	Total.	at 48	at 24	Total.	Entrance fees at 32	Total Income
Jan. 1, 1860, ..	78	58	136	3744	1392	5136	1376	6512
April 4, „ ..	98	70	168	4704	1680	6384	928*	7312

A paper was read "On the great Flood of the Indus in August, 1858," by Captain Montgomerie, Bengal Engineers.

On the motion of Major Thuillier, the special thanks of the meeting were voted to Captain Montgomerie for his interesting paper.

The Officiating Librarian submitted the usual monthly report.

The Library has received the following accessions since the meeting in March last.

Presented.

Monthly Notices of the Royal Astronomical Society, Vols. 14, 16 and 17.—BY THE SOCIETY.

Proceedings of the Royal Irish Academy, Parts 1 to 8 of Vol. 7.—BY THE ACADEMY.

Monographie des Guêpes Sociales, Cahier 8, 9. Par Henri de Saussure.—BY THE AUTHOR.

Selections from the Records of Government, N. W. P., 2 copies of Part 33.—BY THE GOVERNMENT.

A Classified Catalogue of the Raw Produce of the Madras Exhibition of 1859, 2 copies.—BY THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Report of the British Indian Association for 1859.—BY THE ASSOCIATION.

The Oriental Christian Spectator for February, 1860.—BY THE EDITOR.

Selections from the Records of the Bombay Government, No. 52.—BY THE GOVERNMENT.

Memoirs of the Royal Astronomical Society, Vols. 23, 25 and 26.—BY THE SOCIETY.

* For the three months.

Astronomical Observations made at the Observatory of Cambridge, By the Rev. James Challis, M. A., F. R. S.—BY THE OBSERVATORY.

Magnetical and Meteorological Observations made at Toronto in Canada, Vol. 3.

Report of the British Association, held in August, 1856.—BY THE ASSOCIATION.

The Athenæum for December, 1859.—BY THE EDITOR.

Transactions of the Royal Irish Academy, Vol. 23, Part 2.—BY THE ACADEMY.

The Philosophical Magazine, No. 124, for January, 1860.—BY THE EDITORS.

Voyage round the World of the Royal Frigate Eugene, Part 6.—BY THE ROYAL ACADEMY OF STOCKHOLM.

Map of the China Coast.—BY MAJOR THUILLIER.

Purchased.

Annales des Sciences Naturelles, No. 5 of Tome 11, 4 series.

Conchologia Iconica, Parts 188, 189.

Sanskrit Wörterbuch, Part 3.

Revue De Zoologie, No. 11, 1859.

The Annals and Magazine of Natural History, Vol. 5, No. 25.

Deutsches Wörterbuch, Vol. 3.

Comptes Rendus, Tome 50, No. 1.

Journal Des Savants for November, 1859.

Die Lieder Des Hafis, Vol. 2, Part 4.

The Literary Gazette, Nos. 77 to 81.

Revue des Deux Mondes for 15th December, 1859 and 1st January, 1860.
2 Nos.

The Westminster Review, No. 33, for January, 1860.

FOR MAY, 1860.

The Monthly General Meeting of the Asiatic Society was held on the 2nd Instant.

A. Grote, Esq., President, in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From Major H. L. Thuillier, a few sheets of the engraved Indian Atlas.

2. From the Rev. J. Long, a copy of his work entitled "The Indigenous Plants of Bengal."

3. From Baboo Kaliprusunno Singh a copy of *Purana Sangraha*, part I. (containing a translation in Bengali of the first Book of the *Mahabharata*.)

4. From Captain Layard, through Lieutenant-Colonel Young, five base silver coins.

The following is Captain Layard's account of them :—

"Berhampore, 3rd April, 1860.

"MY DEAR YOUNG,—The accompanying five coins were found by Assistant Overseer Bheemser Singh in digging the foundations of the Post Office buildings at Rajmehal. You will perceive that they bear the date, A. H. 1155, and as I read, are of the reign of Mahomed Shah, and were struck at Moorshedabad. They are of a very base coinage, seemingly half copper and lead.

"Will you kindly present these coins to the Asiatic Society.

Yours sincerely,

(Signed) F. P. LAYARD."

5. From J. H. Gurney, Esq., M. P., of Catton Hall, Norwich, the following skeletons in beautiful condition, and ready mounted :—

VULPES VULGARIS, European Fox.

MUSTELA PUTORIUS, Pole-cat.

MELES TAXUS, Badger.

PHOCA VITULINA, Seal.

ERINACEUS VULGARIS, Hedgehog.

ARVICOLA AMPHIBIA, Water Vole.

LARUS MARINUS, Great Black-backed Gull.

MERGUS MERGANSER, Goosander.

COLYMBUS ARCTICUS, Black-throated Loon.

FRATERCULA ARCTICA, Puffin.

Also British skins of Quails, Snipes, and little Grebes, to compare with their Indian representatives.

The special thanks of the meeting were voted to Mr. Gurney for this valuable addition to the Society's osteological collection.

6. From Major G. G. Pearse, Commandant, 3rd Sikh Irregular Cavalry, a skin of *HÆMATORNIS CHEELA*.

Read the following letters from Government in reply to the appli-

cation of the Society that their Curator, Mr. Blyth, might be deputed as naturalist to accompany the China force.

FROM R. B. CHAPMAN, ESQ.,

TO W. S. ATKINSON, ESQ.,

Secy. to the Asiatic Society.

Council Chamber, the 7th April, 1860.

SIR,—Your letter, No. 88, dated the 27th February last, containing the proposal of the Society to send Mr. Blyth to China, in connection with the Military Expedition now in course of being despatched to that country, having been referred for the orders of His Excellency the Governor-General, I am now directed to transmit a copy of a letter, No. 78, dated the 19th ultimo from the Secretary with His Lordship on the proposal.

I have the honor to be, Sir,

Your most obedt. servant,

(Signed,) R. B. CHAPMAN,

Under-Secy. to the Govt. of India.

FROM C. BEADON, ESQ.,

Secy. to the Govt. of India with the Govr.-Genl.

TO W. GREY, ESQ.,

Secy. to the Govt of India, Home Dept. Calcutta,

Camp Deenanugger, the 19th March, 1860.

SIR,—I have the honor to acknowledge the receipt of your letter, No. 463, dated 3rd Inst., submitting copy of a communication from Mr. W. S. Atkinson, Secretary to the Asiatic Society, containing a proposal to send Mr. Blyth to China, in connection with the Military Expedition now in course of being despatched to that country.

2. In reply I am directed to state that the Governor-General much regrets that it is not in his power to view favorably the proposal contained in Mr. Atkinson's letter.

3. The Government of India is aware that Her Majesty's Government desires to keep the Staff Establishment of the Army in China down to the lowest number.

4. The Government of India knows too that space on ship-board will be very valuable.

5. It is impossible to say whether any base of operations on the

Northern coast will be taken up, or whether the fleet will serve as the base; in the latter case Mr. Blyth's operations would be carried on only at a great disadvantage, if at all.

6. Mr. Blyth's readiness to run all risks in the pursuit of science is creditable to him; but if the Government of India send him to China the Commander of the Force will be responsible for his protection and that of his Assistants.

7. The Governor-General is strongly against attaching non-combatants to Sir Hope Grant's Force in the present aspect of affairs. It may be different if we take a footing on the coast; and should this happen, it may be a reason for reconsidering the proposal of the Asiatic Society. But until we see our way more clearly as to the nature of the operations in China, His Excellency thinks it is the duty of the Government of India to add as little as possible to Sir Hope Grant's responsibilities and to keep his Force as compact as possible.

8. The Governor-General has no knowledge of the intention of Her Majesty's Government to send any naturalist. If any person is so employed it will most probably be the Medical Officer of one of Her Majesty's ships, as has been done on some other occasions.

9. The Governor-General has before him a nominal list of the Staff of the French Expedition. His Excellency cannot say whether it is complete, but there is no scientific functionary in it.

I have the honor to be, &c.,

(Signed) C. U. AITCHESON.

Read a letter from Major R. C. Tytler expressing his desire to withdraw from the Society.

The following gentlemen, duly proposed at the last meeting, were balloted for and elected ordinary members.

The Right Hon'ble J. Wilson.

R. Temple, Esq. B. C. S.

Charles Hobhouse, Esq. B. C. S.

Dr. H. Halleur.

Capt. F. S. Stanton, Bengal Engineers.

Capt. Adrian D. Vanrenen.

Baboo Jogindra Narain Roy.

The following gentlemen were named for ballot as ordinary members at the next meeting.

W. Ritchie, Esq., M. A., Advocate General, proposed by Mr. Atkinson, seconded by the President.

J. G. Thomson, Esq., proposed by Mr. F. Fisk Williams, seconded by Mr. Atkinson.

The Rev. W. Ayerst, Rector of St. Paul's school, proposed by Mr. Cowell, seconded by Mr. Atkinson.

C. J. Campbell, Esq., C. E., Delhi, proposed by Lieut.-Col. H. Yule, seconded by Capt C. H. Dickens.

Report of the Council.

The Council beg to submit the following report of the Philological Committee for the approval of the Society.

REPORT.

The Philological Committee beg to recommend to the Council that the Persian Historical work entitled *Tarikhi Másáúdí* be published in the new series of the *Bibliotheca Indica*. Mr. Morley has offered to send his transcript of the original, prepared from several MSS. for the Oriental Text Society, but which he is willing to hand over to the Asiatic Society, to publish in their *Bibliotheca Indica*. The work would occupy about four *fasciculi*, and as it is the composition of Sultan Másáúdí's Secretary, Abúl Fuzl Báiháki, it offers a contemporary picture of the period. For the importance of the time itself, it will be sufficient to quote the following from Elphinstone's History.

"Másáúdí's period must have been one of the most deserving of notice in the whole course of the career of the Muhammadans in India. It must have been then that permanent residence in India, and habitual intercourse with the natives, introduced a change into the manners and ways of the invaders, that the rudiments of a new language were formed and a foundation laid for the present national character of the Muhammadan Indians."

The Committee also beg to recommend the publication of the Sanserit text of the Aphorisms of Sandilya, which Dr. Ballantyne has offered to edit, with a native commentary and an English translation. The text and commentary will only fill about one *fasciculus*, and the work itself appears to be one on every account well deserving of being included in the *Bibliotheca Indica*.

The report was adopted.

A paper was read by E. B. Cowell, Esq., M. A., on the *Kirán-us-Sadain*, a Persian historical poem, by Amir Khusrau.

The thanks of the meeting were voted to Mr. Cowell for his valuable paper.

The Officiating Librarian submitted the usual monthly report.

The Library has received the following accessions since the meeting in April last.

Presented.

Quarterly Journal of the Geological Society, Nos. 60 and 61.—BY THE SOCIETY.

Transactions of the Zoological Society of London, Vol. IV. Parts 4, 5 and 6.—BY THE SOCIETY.

Proceedings of the Zoological Society for 1856, 57, and 58, and also parts 1, 2, and 3 of 1859.—BY THE SOCIETY.

General Report of British India, Vols. 1, 2 and 3.—BY THE BENGAL GOVERNMENT.

Maps and Plans to accompany Government Record, No. 53.—BY THE SAME.

Annual Progress Reports of the Executive Engineers, No. 53.—BY THE SAME.

The Indigenous Plants of Bengal.—BY THE AUTHOR.

Purana Sangraha (being a translation in Bengali of Mahabharata), Part I.—BY THE EDITOR.

The Oriental Christian Spectator for March, 1860.—BY THE EDITOR.

The Annals of Indian Administration, Vol. IV. Part 1.—BY THE GOVERNMENT OF INDIA.

A Classified Catalogue of the Raw Produce of the Madras Exhibition.—BY THE MADRAS GOVERNMENT.

Bibidharta Sangraha for Bhadro.—BY THE EDITOR.

Guide to the Gardens of the Zoological Society of London.—BY THE SOCIETY.

Notices of the Proceedings of the Royal Institution of Great Britain, Part IX. November, 1858 to July, 1859.—BY THE INSTITUTION.

Selections from the Records of the Bombay Government, No. 55.—BY THE GOVERNMENT.

Journal Asiatique, Vols. 14 and 15 being Nos. 55, 56.—BY THE SOCIETY.

The Athenæum for January and February, 1860.—BY THE EDITOR.

The Philosophical Magazine, for February and March, 1860.—BY THE EDITORS.

Proceedings of the Royal Society of London, Vol. X. No. 37.—BY THE SOCIETY.

Weber's Vajrasūci Des Açvaghosha.—BY THE AUTHOR.

Journal of the Statistical Society of London, Vol. XXIII. Part I.—BY THE SOCIETY.

Jahrbuch, Vol. X. No. 3.—BY THE AUSTRIAN ACADEMY.

Juynboll's Lexicon Geographicum, Nonum Fasciculum.—BY THE AUTHOR.

A pamphlet entitled "English version of the New Taxes."—BY THE BENGAL GOVERNMENT.

A pamphlet entitled "English version of the New Indian Paper Currency."—BY THE SAME.

Purchased.

The Annals and Magazine of Natural History, Vol. 5, Nos. 26 and 27.

The Quarterly Review, No. 213 for January, 1860.

The Edinburgh Review, No. 225, for June, 1860.

Revue des Deux Mondes for 15th January, 1st February and 15th February, 3 Nos.

Comptes Rendus, Tome 50. Nos. 2, 3, 4, 5, 6, 7, 8, 9 and 10.

The Literary Gazette, Nos. 82 to 89.

Journal des Savants for December, 1859 and January, 1860.

The American Journal of Science and Arts for January, 1860.

The Natural History Review for January, 1860.

Revue De Zoologie, No. 12, 1859.

Macnaghten's Hindu and Muhammadan Law. Edited by Prof. H. H. Wilson.

Geschichte des Abbasidenchalifats in Egypten, Vol. I.

Elfachri, Von W. Ahlwardt.

Annales des Sciences Naturelles, Tome XI. No. 6.

Sanskrit-Wörterbuch, Vol. 3.

Conchologia Iconica, Part 193.

Jules Thonnelier's Vendidad Sadé.

Sidi Khalil's Précis de Jurisprudence Musulmane.

Les Avadânas, Vols. 1, 2 and 3.—BY M. STANISLAUS JULIEN.

FOR JUNE, 1860.

The Monthly General Meeting of the Asiatic Society was held on the 6th instant.

A. Grote, Esq., President, in the chair.

The proceedings of the last Meeting were read and confirmed.

Presentations were received—

1. From Major Bouverie, Governor-General's Agent at Bhurtpore, a meteorite which fell at a village about fifteen miles south of Bhurtpore.

2. From the Government of India, Home Department, No. 53 of the Selections from the Records of the Bombay Government.

3. From the Bengal Government No. 32, and Parts I. and II. of No. 33, of the Selections from its Records, also a copy of Mr. Allen's report on the administration of the Cossyah and Jynteah Hill Territory.

4. From R. Swinhoe, Esq., of H. M. Consulate, Amoy, a large collection of Chinese birds and a few quadrupeds, many of the former not presented to the Society, but forwarded merely for inspection; also a small collection of birds from the Philippine Islands; and another from South Africa, comprising several species new to the Society's Museum.

5. From Major R. C. Tytler of the late 38th B. N. I., a collection of sundries, comprising a few acceptable specimens, but nothing new to the Society's Museum excepting a Chinese *Syngnathus*, evidently taken from one of the insect Boxes commonly brought from Canton.

The following gentlemen, duly proposed at the last meeting, were balloted for and elected ordinary members.

W. Ritchie, Esq., M. A., Advocate General.

The Rev. W. Ayerst.

C. J. Campbell, Esq.

J. G. Thompson, Esq.

The following gentlemen were named for ballot as ordinary members at the next meeting.

Rajah Bunsput Sinha of Allahabad, proposed by Mr. Atkinson seconded by the President.

A. B. Sampson, Esq., Assistant Secretary, Department Public Works, proposed by Col. Baird Smith, seconded by Dr. Eatwell.

W. Grey, Esq., Secretary to the Government of India, Home Department, proposed by the President, seconded by Col. Baird Smith.

J. P. Grant, Esq., Jr., proposed by the President, seconded by Mr. Atkinson.

Dr. Simpson, Civil Surgeon, proposed by the President, seconded by Mr. Atkinson.

George H. M. Batten, Esq., B. C. S., proposed by Mr. J. Strachey, seconded by Dr. T. Thomson.

E. G. Mann, Esq., Rajshaye, proposed by Mr. W. Theobald, Jr., seconded by Mr. J. G. Medlicott.

L. F. Byrne, Esq., C. E., proposed by the President and seconded by Mr. Leonard.

George Shelverton, Esq., proposed by Col. Waugh, seconded by Major Thuillier.

Syud Ahmed Khan, of Moradabad, proposed by the President, seconded by Mr. Cowell.

Communications were received—

1. From Lord H. Ulick Browne, Under-Secretary to the Government of India, a copy of a letter from the Superintendent of Port Blair, reporting an attack made by some of the aborigines on Dr. Gamack and his boat's crew.

2. From Baboo Radhanauth Sikdar, Abstract of the Meteorological Observations taken at the Surveyor General's Office for November last.

Mr. Cowell read a paper on "Attempts by Asiatic Monarchs to introduce a Paper Currency."

The thanks of the meeting were given to Mr. Cowell for his valuable and interesting communication.

The Officiating Librarian submitted the usual monthly report.

The Library has received the following accessions since the meeting in May last.

Presented.

Denschriften des Kaiserlichen Akademie Der Wissenschaften, Bands IX., XV. and XVI.—BY THE ACADEMY.

Det Norske Sprogs.—BY THE CRISTIANIA SOCIETY.

Kongeriget Norge, 3 parts.—BY THE SAME.

Undervisningsvæsenets Zilstand i Norge, for 1853.—BY THE SAME.

Kongeriget Norge for 1857.—BY THE SAME.

Beretning, 1851—1855.—BY THE SAME.

Piperviten og Ruselotbatten.—BY THE SAME.

Chart of the Northern Coast, Nos. 13 A, 13 B, 12 A. B., 12 B.—BY THE SAME.

Aarsberetning for 1857.—BY THE SAME.

Beretning for 1857.—BY THE SAME.

Udtog af Norges Riges historie.—BY THE SAME.

Nyt Magazin for Naturvidenskaberne, Vol. 10, part 2.—BY THE SAME.

General Beretning for 1856 and 1857.—BY THE SAME.

Journal of the Royal Asiatic Society, Vol. 17, Part 2.—BY THE SOCIETY.

Proceedings of the Royal Geographical Society of London, Vol. IV. No. 1.—BY THE SOCIETY.

The Athenæum for March, 1860.—BY THE EDITOR.

Madras Journal of Literature and Science, April—September, 1859.—BY THE MADRAS LITERARY SOCIETY.

Jahrbuch of the Austrian Academy for January, February and March.—BY THE ACADEMY.

Journal of the Agricultural and Horticultural Society, Vol. XI. Part 2nd.—BY THE SOCIETY.

Journal Asiatique, Vol. 15, No. 57.—BY THE SOCIETY.

Les Aventures de Kamrup.—BY M. GARCIN DE TASSY.

The Oriental Christian Spectator for April, 1860.—BY THE EDITOR.

The Oriental Baptist for May and June.—BY THE EDITOR.

The Calcutta Christian Observer for May and June.—BY THE EDITORS.

J. C. Hörbye om de erratiske Phænomenener.—BY THE AUTHOR.

M. Sars on Middelhavets Litoral-Fauna, Parts 1 and 2.—BY THE AUTHOR.

Archiv für Kunde Österreichischer Geschichts-Quellen, Vol. XX. Parts 1 and 2 and Vol. XXI. Part 1.—BY THE AUSTRIAN ACADEMY.

Notizenblatt for 1858.—BY THE SAME.

Selections from Papers on Indigo Cultivation, No. 2.—BY THE BRITISH INDIAN ASSOCIATION.

Mr. Allen's Report on the Administration of the Cossyah and Jynteah Hill Territory.—BY THE BENGAL GOVERNMENT.

Selections from the Records of the Bengal Government, Nos. 32 and 33 Parts 1 and 2.—BY THE SAME.

Middeldorpf's *Fistulis Ventriculi Externis*.—BY THE AUTHOR.

Selections from the Records of the Madras Government, Nos. 52 and 53.—BY THE MADRAS GOVERNMENT.

Physikalske Meddelelser.—BY THE CHRISTIANIA SOCIETY.

London University Calendar for 1859-60.—BY THE UNIVERSITY.

Sitzungsberichte der Akademie der Wissenschaften, Vol. 27, part 2, Vol. 30. Nos. 16 and 17; Vol. 31, Nos. 18, 19 and 20; Vol. 32, Nos. 21,

22 and 23 ; Vol. 33, Nos. 24, 25, 26, 27, 28 and 29 ; Vol. 34, Nos. 1, 2, 3, 4, 5 and 6 and Vol. 35, Nos. 7, 8, and 9.—BY THE ACADEMY.

Sitzungsberichte (Philosophisch-Historische Classe), Vol. 27, Nos. 4 and 5 ; Vol. 28, Nos. 6, 7 and 8 ; Vol. 29, Nos. 9 and 10 in one Vol. and Vol. 30, No. 1.—BY THE ACADEMY.

Magnetischen Beobachtungen.—BY THE SAME.

Universitetels Budget, 1857—1860.—BY THE CHRISTIANIA SOCIETY.

The Indian Annals of Medical Science, No. XII.—BY THE EDITORS.

The Philosophical Magazine for April, No. 127.—BY THE EDITORS.

Purchased.

The Annals and Magazine of Natural History, Vol. 5, No. 28.

The Westminster Review for April.

The Edinburgh Review for April.

Revue de Zoologie, Nos. 1, 2 and 3 for 1860.

The Literary Gazette, Nos. 90 to 94.

The American Journal of Science and Arts for March, 1860.

Revue des Deux Mondes for 1st March, 15th March and 1st April, 1860.

Annales des Sciences Naturelles, Vol. 12, No. 1.

Journal des Savants for February and March, 1860.

Comptes Rendus, Vol. 50, Nos. 11 to 14.

Conchologia Iconia, Part 194.

Integration, By Dr. Joseph Petzold, Part 6.

'Oqailiden-Dynastie.

Deutsches Wörterbuch, By Jacob and W. Grimm, Vol. 2, Part 7.

Nala und Damayanti, By H. Brockhaus.

'Oqba Ibn Nafi' el-Fihri.

Etude La Geographic.

Buddhistische Triglotte.

Zeitschrift, Vol. 9.

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